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GISELE CAVALCANTE MORAIS

VARIABILIDADE EM DISTINTAS ESCALAS ESPAÇO-TEMPORAIS DA MACROFAUNA BÊNTICA DE UM ESTUÁRIO SUBTROPICAL

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VARIABILIDADE EM DISTINTAS ESCALAS ESPAÇO-TEMPORAIS DA MACROFAUNA BÊNTICA DE UM ESTUÁRIO SUBTROPICAL

Tese apresentada ao Programa de Pós-Graduação em Sistemas Costeiros e Oceânicos, Setor de Ciências da Terra, Centro de Estudos do Mar da Universidade Federal do Paraná, como requisito parcial à obtenção do título de Doutor em Sistemas Costeiros e Oceânicos.

Orientador: Dr. Paulo da Cunha Lana

Linha de Pesquisa: Biologia e Ecologia de Sistemas Oceânicos e Costeiros

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Centro de Estudos do Mar - Setor Ciências da Terra - UFPR

Avn. Beira-mar, s/nº - Pontal do Sul - Pontal do Paraná - Paraná - Brasil

Tel. (41) 3511-8644 - Fax (41) 3511-8648 - www.cem.ufpr.br - E-mail: pgsisco@ufpr.br

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Membro Examinador

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Membro Examinador

Dr. Pablo Muniz Maciel (UDELAR)
Membro Examinador

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Prof. Dr. Paulo da Cunha Lana
Orientador – Centro de Estudos do Mar, UFPR

Prof. Dr. Paulo R. Pagliosa Alves
Departamento Geociências, UFSC

Prof. Dr. Maurício Garcia de Camargo
Universidade Federal do Rio Grande, FURG

Prof. Dr. Paulo Cesar Paiva
Departamento de Zoologia, UFRJ

Prof. Dr. Pablo Muniz Maciel
Universidad de La República/Uruguay

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Quem fica esperando que o vento
mude e que o tempo fique bom
(esperando pelas condições perfeitas),
nunca plantará e nem colherá nada.

Eclesiastes 11:4

RESUMO

A descrição de padrões de distribuição das espécies bênticas é fundamental para o desenvolvimento e aplicação de estratégias de manejo e conservação dos estuários, que são ambientes confinados e muito vulneráveis à poluição. A distribuição desses organismos é influenciada por interações entre fatores físicos, químicos e biológicos, de origem natural e/ou antrópica, que podem variar em distintas escalas espaciais e temporais. Este estudo analisa a variabilidade da estrutura taxonômica e funcional das assembleias macrobênticas de baixios entremarés não vegetados ao longo do gradiente estuarino na Baía de Guaratuba, como forma de inferir seus principais fatores/forçantes reguladores. Para avaliar a variabilidade espacial da macrofauna foram definidas quatro escalas: três Setores (10^3 m), quatro Baixios dentro de cada Setor (10^2 m), três Locais dentro de cada Baixio (10^1 m) e três unidades amostrais dentro de cada Local (10^0 m). Simultaneamente, foram tomadas amostras para análises das variáveis ambientais: granulometria, carbono, nitrogênio, fósforo, pigmentos fotossintéticos, matéria orgânica, carbonato de cálcio, salinidade, pH, temperatura e profundidade da camada de descontinuidade redox do sedimento. Para avaliar a variabilidade espaço-temporal da macrofauna, utilizamos o mesmo delineamento amostral das analises de variabilidade espacial, com redução de um nível na escala de centenas de metros: 3 Setores X 3 Baixios X 3 Locais X 3 réplicas para a macrofauna, além da coleta de uma réplica em cada local para as análises das variáveis ambientais. Foram realizadas três campanhas quinzenais, replicadas no final do período chuvoso e seco. Foram utilizadas análises univariadas e multivariadas para avaliar a estruturação da macrofauna e os principais fatores/forçantes atuantes nas diferentes escalas. A hipótese de que os atributos taxonômicos (abundância e composição das assembleias) e funcionais (diversidade funcional e composição dos traços funcionais) variam na maior escala espacial, que corresponde ao gradiente de salinidade, não foi refutada. No entanto, a salinidade não pode ser considerada a única forçante para explicar a distribuição da macrofauna ao longo do gradiente estuarino. As variáveis pH, tamanho do grão, quantidade de sedimentos finos, profundidade da camada de descontinuidade redox, matéria orgânica, pigmentos fotossintéticos e nutrientes também variam na maior escala. O padrão espacial foi consistente ao longo do tempo, principalmente para as variáveis salinidade, pH, tamanho do grão e profundidade da camada de descontinuidade redox, indicando que estas forçantes condicionaram primariamente o estabelecimento do conjunto de espécies com características taxonômicas e funcionais específicas entre os diferentes setores estuarinos. Entretanto, a riqueza de táxons, abundancia de alguns táxons dominantes e o traço “modo de alimentação” variou nas menores escalas, refutando a nossa principal hipótese de trabalho. As análises de composição taxonômica e funcional indicaram mudanças nas menores escalas espaciais e temporais, com sobreposição entre os setores intermediário e externo, principalmente no período seco. Essa variabilidade nas menores escalas foi relacionada principalmente com as mudanças na quantidade e qualidade da matéria orgânica, carbonato de cálcio, nitrogênio, razões nitrogênio:fósforo e carbono:nitrogênio. Portanto, nenhum dos modelos empíricos ou conceituais baseados apenas na salinidade pode explicar a variação total para a estruturação das assembleias macrobênticas no gradiente estuarino. Os padrões de distribuição das assembleias bênticas resultaram de uma complexa interação de fatores físico-químicos que variam simultaneamente na maior e menor escala de

espaço e tempo. A abordagem em múltiplas escalas pode contribuir para ampliar o conhecimento científico de distribuição dos organismos bênticos e oferecer suporte para estudos macroecológicos, avaliação e monitoramento ambiental nos sistemas estuarinos.

Palavras-chave: Macrobentos. Planícies de maré. Escalas hierárquicas. Gradiente estuarino. Baía de Guaratuba.

ABSTRACT

The patterns in benthic species distribution are relevant information to management and conservation of the estuaries. Estuarine environment are confined and more vulnerable to natural or anthropogenic disturbances than other aquatic ecosystems. Variation of benthic assemblages is influenced by interactions among physical, chemical and biological factors at multiple spatial and temporal scales. In this thesis, we have assessed the taxonomic structure and functional traits of intertidal benthic assemblages to key environmental drivers along a subtropical estuarine gradient from southern Brazil. To achieve this goal, we have applied a hierarchical sampling design to assess benthic variation at multiple spatial and temporal scales. We have assessed benthic variation of each of several spatial scales, from meters to kilometers: three Sectors (10^3 m), four Tidal flats within Sector (10^2 m), three Location within Tidal flats (10^1 m) and three replicates within Location (10^0 m). Simultaneously, environmental drivers were measured: grain size, carbon, nitrogen, phosphorus, photosynthetic pigments, organic matter, calcium carbonate, salinity, pH, temperature and depth of redox discontinuity layer. Additionally, we have assessed spatiotemporal variability of intertidal benthic assemblage along estuarine gradient using similar spatial sampling design before, cutting one Tidal flat level for each Sector: 3 Sectors x 3 Tidal flats x 3 Locations X 3 replicates for benthic organisms and 3 replicates for environmental drivers. Nested spatial design was carried out on each three consecutive fortnights during rainy and dry seasons. The variability of benthic assemblages and environmental drivers was assessed with univariate and multivariate analysis. The hypothesis that taxonomic (assemblage composition and abundance) and functional (composition and functional diversity) structure vary at the largest spatial scale, corresponding to the salinity gradient, was not refuted. However, salinity variation which is main environmental driver in estuaries, could not explain by itself macrobenthic distribution on the intertidal habitat along estuarine gradient. Other environmental variables (nutrients, organic matter, photosynthetic pigments, pH, grain size and redox discontinuity layer) also varied at the largest scale acting as confounding factors. Spatial distribution along gradient was always recognized over time, suggesting that environmental drivers at largest scale played an important role in the specific taxonomic and functional groups among sectors. However, variations at small scales in number of species, the density of some numerically dominant taxa and feeding mode trait, refuted our main working hypothesis. Also, taxonomic and functional composition changed at small spatial and temporal scales. The intermediate and outer sectors often overlapped but were clearly separated from the inner sector, mainly on the dry season. Such small-scale variability in the macrobenthic assemblage should be related to organic matter quantity and quality, calcium carbonate, nitrogen, nitrogen:phosphorus and carbon:nitrogen ratios. Therefore, our findings do not fully support previous conceptual or empirical models based only salinity gradient for estuarine macrobenthic assemblages. Benthic distribution patterns thus result from a complex interaction among environmental drivers, varying simultaneously at largest and small spatiotemporal scales. Our findings suggest that multiple spatiotemporal scales approach provide a better scientific knowledge to understand benthic distribution patterns and useful for macroecological studies, environmental monitoring and assessment in the estuarine systems.

Keywords: Macrobenthos. Tidal flats. Hierarchical scales. Estuarine gradient. Guaratuba Bay.

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INTRODUÇÃO GERAL

Diversos fatores ou forçantes de origem natural e/ou antrópica podem afetar a distribuição dos organismos estuarinos (McLusky e Elliott 2004; Gray e Elliott, 2009), principalmente no caso dos invertebrados bênticos, que podem se mostrar muito sensíveis a alterações de curto, médio e longo prazos. Estes fatores podem envolver processos bióticos e abióticos de extensão local, regional ou global (Little, 2000; Gray e Elliott, 2009), que interagem de forma complexa na regulação da ocorrência e abundância das espécies bênticas (Chapman et al., 2010; McArthur et al., 2010).

As diferenças na estrutura de assembleias bênticas ao longo de um estuário ocorrem principalmente devido às variações de salinidade, pH, profundidade, turbidez, velocidade da corrente, concentração de nutrientes, composição do sedimento, além das interações ecológicas e dos efeitos de atividades humanas (McLusky e Elliott, 2004; Gray e Elliott, 2009). A variação destes fatores depende das características do estuário (Galván et al., 2010; Elliott e Whitfield, 2011). As variáveis abióticas podem formar diferentes gradientes ambientais que variam no espaço e no tempo. Embora o gradiente de salinidade tenha sido estabelecido como determinante da estrutura de assembleias bênticas em sistemas estuarinos, ainda existem controvérsias de como variam a distribuição e a diversidade ao longo do gradiente estuarino como um todo (Attrill, 2002; McLusky e Elliott, 2004; Whitfield et al., 2012).

As generalizações sobre a distribuição e diversidade (taxonômica e funcional) dos organismos bênticos em gradientes estuarinos foram baseadas principalmente em pesquisas realizadas nas regiões temperadas. Há ainda muitas lacunas neste conhecimento em áreas tropicais e subtropicais. Em muitos locais não há qualquer tipo de estudo e em outros existem apenas descrições dos padrões obtidos a partir de amostragens espaciais aleatórias sem contemplar múltiplas escalas. Em geral, os estudos são realizados principalmente no sublitoral e utilizam métodos de transecções transversais ou grids (i.e. Cortelezzi et al., 2007; Souza et al., 2013) e transecção longitudinal (i.e. Teixeira et al., 2008; Barros et al., 2012) seguindo o gradiente de salinidade do estuário. Estes métodos de amostragem dificultam a real compreensão das principais forçantes ambientais que atuam na variabilidade das assembleias bênticas em distintas escalas de espaço e tempo.

Neste contexto, múltiplas escalas espaciais e temporais hierarquizadas podem ser incorporadas aos delineamentos amostrais para melhor descrever os padrões observados (Underwood, 2000; Lopez de Casenave et al., 2007). As análises hierárquicas são úteis para detectar quais fatores atuam em determinada escala espacial e suas variações no tempo. Este tipo de abordagem pode ser usado para ampliar o conhecimento sobre o funcionamento dos estuários e auxiliar no desenvolvimento de ferramentas que avaliam mudanças naturais e possivelmente antrópicas na distribuição das espécies.

Na região subtropical do sul do Brasil, continuam escassas as informações sobre os padrões de distribuição da fauna bêntica de planícies de maré não vegetadas (baixios) ao longo de gradientes salinos (Neves e Valentin, 2012; Bernardino et al., in press). Uma fauna diversificada de invertebrados bênticos é encontrada em baixios estuarinos no sul do Brasil (Lana et al., 1997; Boehs et al., 2004; Rosa e Bemvenuti, 2007), destacando a importância destes habitats para a conservação da biodiversidade das zonas costeiras. A Baía de Guaratuba foi definida como área de prioridade extremamente alta para a conservação da biodiversidade pelo Ministério do Meio Ambiente, por apresentar alta importância biológica (MMA, 2004). Esse sistema estuarino está dentro dos limites da Área de Proteção Ambiental (APA) de Guaratuba, o que demanda uma avaliação mais criteriosa dos padrões de distribuição dos organismos, como conhecimento base para atividades de planejamento e gestão ambiental. Entretanto, as informações sobre os invertebrados bênticos neste estuário ainda são restritas a poucos grupos taxonômicos, foram realizadas em trechos restritos do estuário, ou não adotaram delineamentos amostrais em múltiplas escalas espaço-temporais (Blankensteyn e Moura, 2002; Masunari, 2006; Silva, 2008; Pieper, 2010). Isso dificulta o planejamento de ações futuras para ordenamento no uso de recursos naturais e mitigação de impactos ambientais.

O Plano de Manejo para a APA de Guaratuba foi apresentado e validado pelo Conselho Gestor em 2006, com informações sobre a caracterização geral da APA, o zoneamento ecológico-econômico das zonas ambientais estabelecidas e o seu sistema de gestão. O zoneamento dos manguezais e da baía, áreas importantes para a conservação da biodiversidade, ficou para ser realizado posteriormente pela Secretaria Estadual do Meio Ambiente (SEMA) e Instituto Ambiental do Paraná (IAP). Em virtude destas lacunas, o Grupo Integrado de Aquicultura e Estudos

Ambientais da Universidade Federal do Paraná (GIA) e outras organizações (*The Nature Conservancy* e Cinco Reinos – Pesquisas e Serviços Ambientais), apresentaram o Plano de Conservação e Gestão da Baía de Guaratuba no ano de 2008. Embora a Baía de Guaratuba tenha sido destacada como prioridade nas ações de pesquisa e conservação no litoral do Paraná (SEMA/IAP, 2008), até hoje o Plano de Manejo da APA de Guaratuba não foi atualizado.

Como outros estuários da costa brasileira, a Baía de Guaratuba vem sofrendo com a ocupação humana desordenada nas últimas décadas, com atividades de maricultura, pesca, agricultura, navegação e turismo (Silveira e Oka-Fiori, 2007; Scheuer e Bahl, 2011). Estas atividades aumentaram a pressão sobre os recursos naturais e níveis de contaminação no estuário (Sanders et al., 2006, 2008; Pietzsch et al., 2010; Patchineelam et al., 2011; Froehner et al., 2012; Combi et al., 2013; Rodrigues et al., 2013; Forcelini et al., 2013; Cotovicz Junior et al., 2014). Estas intervenções têm aumentado progressivamente os níveis de degradação da baía e consequentemente podem afetar o padrão de distribuição dos organismos bênticos, sensíveis às variações ambientais. Neste contexto, os organismos bênticos podem ser vistos como indicadores confiáveis da qualidade ambiental (McLusky e Elliott, 2004; Elliott e Quintino, 2007; Gray e Elliott, 2009). Alterações em sua densidade e/ou diversidade (taxonômica e funcional) podem indicar processos de degradação no sistema estuarino. As mudanças na biodiversidade podem ter consequências diretas para os processos ecológicos e consequentemente para os serviços ambientais que beneficiam as atividades econômicas e sociais do homem (Chapin et al., 2000).

Os resultados obtidos nesta pesquisa permitiram fazer inferências sobre quais processos e fatores ambientais ou antrópicos influenciam a distribuição dos invertebrados em diferentes escalas espaço-temporais no sistema estuarino subtropical. Além disso, foi possível avaliar se as predições gerais dos modelos empíricos ou conceituais de diversidade estuarina se aplicam a um sistema estuarino subtropical.

A tese foi estruturalmente dividida em três capítulos, redigidos em inglês, na forma de artigos científicos.

O primeiro capítulo avalia a estrutura da macrofauna no entremarés em diferentes escalas espaciais ao longo do gradiente estuarino em um sistema subtropical. A variabilidade na estrutura da macrofauna bêntica foi quantificada

considerando quatro escalas espaciais hierarquizadas (desde metros a quilômetros) ao longo do gradiente estuarino. Essa abordagem em múltiplas escalas espaciais permitiu uma investigação criteriosa do efeito do gradiente de salinidade na estrutura da macrofauna que é sempre destacada como fator determinante da variação em sistemas estuarinos.

O segundo capítulo avalia os padrões de distribuição dos invertebrados em baixios entremarés não vegetados, considerando distintas escalas espaciais hierarquizadas ao longo do gradiente estuarino de salinidade e energia da Baía de Guaratuba, que podem variar em diferentes períodos de amostragem. Neste capítulo foram destacadas as escalas espaciais e temporais de maior variabilidade da macrofauna bêntica inferindo as principais forçantes responsáveis pela variação no sistema estuarino.

O terceiro capítulo avalia a variabilidade na diversidade funcional da macrofauna bêntica em múltiplas escalas espaço-temporais no mesmo sistema estuarino subtropical. Consequentemente, foram analisadas as variações espaciais e temporais na diversidade de traços funcionais e composição funcional da macrofauna bêntica em função dos fatores abióticos ao longo do gradiente estuarino, considerando as mesmas escalas espaciais e temporais do capítulo dois.

OBJETIVOS

Geral

Avaliar a variação espacial e temporal da estrutura taxonômica e funcional das assembleias macrobênticas de baixios entremarés não vegetados, adotando um delineamento amostral hierarquizado no espaço e no tempo, ao longo do gradiente estuarino da Baía de Guaratuba, estuário subtropical no sul do Brasil.

Específicos

- Avaliar a resposta das assembleias macrobênticas em função da variação espacial dos principais fatores físico-geoquímicos em múltiplas escalas espaciais hierarquizadas ao longo de um gradiente estuarino subtropical;

- Quantificar a variabilidade na estruturação taxonômica das assembleias macrobênticas ao longo do gradiente estuarino subtropical em diferentes escalas espaciais e temporais, procurando inferir fatores ambientais e processos bioecológicos mais relevantes em cada escala;

- Quantificar a variabilidade na diversidade funcional das assembleias macrobênticas com base na análise de traços funcionais em diferentes escalas espaciais e temporais ao longo do gradiente estuarino subtropical, procurando inferir fatores ambientais e processos bioecológicos mais relevantes em cada escala.

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Capítulo 1

Variação das assembleias no entremarés ao longo de um gradiente estuarino subtropical: os modelos conceituais e empíricos são realmente bons?

Intertidal assemblage variation across a subtropical estuarine gradient: how good conceptual and empirical models are?

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Intertidal assemblage variation across a subtropical estuarine gradient: how good conceptual and empirical models are?

Gisele C. Morais[1,2*], Maurício G. Camargo[1,3], Paulo Lana[1,2]

[1] Programa de Pós-Graduação em Sistemas Costeiros e Oceânicos da Universidade Federal do Paraná.

[2] Centro de Estudos do Mar, Universidade Federal do Paraná. Av. Beira-Mar, s/n, Pontal do Sul, CEP 83255-976, PO Box 61, Pontal do Paraná, PR – Brasil.

[3] Instituto de Oceanografia, Universidade Federal do Rio Grande. Rua Doutor Vaz Dias Júnior, Cassino, CEP: 96205-080, Rio Grande, RS – Brasil.

* Corresponding author:

E-mail address: gisellymorais@gmail.com (G.C. Morais)

[2] Tel.: +55 41 35118600; fax: +55 41 35118648

ABSTRACT

Variation of intertidal macrobenthic structure at multiple spatial scales is still poorly known in tropical and subtropical estuaries. We have assessed the structural responses of intertidal benthic assemblages, expressed by variation in number of species, abundance and assemblage composition, to key environmental drivers in a subtropical estuary from southern Brazil. We have applied a hierarchical sampling design to assess benthic variation at each of several spatial scales, from meters to kilometers, along a marked estuarine gradient. The hypothesis that many benthic variables vary at the largest spatial scale, corresponding to the salinity gradient, was refuted for number of species but not for total abundance and species composition. However, physiological stress to salinity variation, an important environmental driver in estuaries, could not explain by itself macrobenthic distribution along local intertidal flats. Nutrient, organic matter, photosynthetic pigments contents, pH, grain size, silt-clay content and the redox discontinuity layer also varied at the largest spatial scale acting as confounding factors. Thus, overall distribution patterns of intertidal benthic assemblages resulted from a complex interaction among environmental drivers, including salinity.

Keywords: macrobenthos; species diversity; ecological distribution; environmental effects; subtropical estuarine gradients; estuarine models.

1.1. Introduction

The marked variability of environmental drivers in coastal areas greatly affects benthic assemblage structure, seen as the combined measure of species diversity, population density and species composition (Underwood et al., 2000). Physical, chemical and biological settings of estuarine systems are often treated as natural stressors, useful as surrogates to describe benthic diversity at global, regional and local scales (Gray and Elliott, 2009; Elliott and Whitfield, 2011). Thus, the assessment of interactions among environmental drivers and richness, abundance and assemblage composition has become a mandatory ecological approach to understanding estuarine structure and functioning.

Estuaries are environmentally stressed areas due to their high physical variability resulting from natural or anthropogenic factors (Elliott and Quintino, 2007). Both sediment and water properties are well-known variability sources of benthic structure and function (Elliott and Whitfield, 2011). The combination of such drivers shapes distinct estuarine gradients, which may cause positive or negative faunal responses, mainly expressed by increases or decreases in abundance and diversity.

Salinity is considered a major driver of benthic estuarine patterns (Elliott and Whitfield, 2011; Whitfield et al., 2012). Since Remane (1934), this perception has given rise to a number of general ecological models to explain faunal variation at community, family or species levels (Attrill, 2002; Attrill and Rundle, 2002; Barros et al., 2008; Whitfield et al., 2012). Remane's classical model (1934), originally developed for Baltic waters, was severely questioned by Whitfield et al. (2012), based on faunal patterns established worldwide. Their revised model for estuaries suggests that: estuarine freshwater assemblages are species poor and do not penetrate saline waters; marine species extend into oligohaline and even freshwater sectors in small numbers; marine species are overwhelmingly dominant in terms of taxa from mesohaline to hyperhaline waters; estuarine/brackish species are most diverse in mesohaline and polyhaline waters, but can also be present in the other estuarine sectors; few species are able to occupy waters with a salinity range of 0-100+.

Theoretical or empirical estuarine models based upon (or biased towards) salinity gradients (Attrill, 2002; Attrill and Rundle, 2002; Whitfield et al., 2012) are vulnerable to criticism mostly for not including other drivers or sources of variability. These generalized patterns may or not be suitable, depending on the benthic descriptors and characteristics of the estuarine system. Likewise, intertidal benthic assemblages have received much less attention than subtidal assemblages have for the development of such models (Whitfield et al., 2012). Their power to generate testable predictions seems to be low, taking into account the huge variation in benthic distribution patterns already known for estuaries worldwide. In addition, although widely used to categorize transitional waters and to putatively predict the spatial range of brackish water organisms, most available models have relied on linear samplings across estuarine gradients (Attrill, 2002; Barros et al., 2008) and have not quantified faunal variability at different spatial scales. This is unfortunate, since the structure of benthic estuarine assemblages clearly responds to drivers that operate in distinct spatial scales (Ysebaert and Herman, 2002; Souza et al., 2013; Giménez et al. 2014).

Spatial complexity in transitional ecosystems are more evident in coastal lagoons (Galván et al., 2010; Pérez-Ruzafa et al., 2011). Salinity is not the main driver to explain species distribution in coastal lagoons (Barnes, 1994; Lardicci et al., 1997) and many authors find no clear gradients (Barnes, 1994; Benedetti-Cecchi et al., 2001; De Biasi et al., 2003) or relate organism distribution in coastal lagoons to confinement gradients independently of the salinity (Garnerot et al., 2004; Bouchereau et al., 2008).

A widely used tool to incorporate multiple scales into benthic surveys is nested sampling design, or the assessment of the relative importance of individual factors and their interactions by evaluating the amount of variation sources for each considered scale (Morrissey et al., 1992). Drivers addressed as major causes of estuarine gradients (i.e. salinity, grain size, energy levels, nutrient concentration) usually operate at larger spatial scales, from kilometers to tens of kilometers (Quintino et al., 2011; Souza et al., 2013; Giménez et al., 2014). Conversely, biological interactions, such as competition, grazing and predation, are presumed to affect diversity, population densities or species distributions at smaller spatial scales (Morrissey et al., 1992; Underwood et al., 2000). However, physical factors can also

be a source of variability at very small scales (cm), such as in the case of vertical zonation (Pérez-Ruzafa et al., 2007).

In this context, nested sampling designs may provide unbiased, independent and rigorous quantitative measures of variability at specific spatial scales (Underwood, 1997) and as such should be used to identify the ecological process that determine benthic diversity and distribution patterns. Although nested sampling designs are not novel approaches in benthic ecology, their use across estuarine gradients is still scant (Ysebaert and Herman, 2002; Giménez et al., 2005; Barnes and Ellwood, 2012), and almost absent in tropical and subtropical estuaries. Recent papers have assessed the distribution of subtropical estuarine macrofauna at a hierarchy of spatial scales along gradients of sewage contamination (Souza et al., 2013; Brauko et al., 2015), but no previous assessments were done across whole salinity gradients.

Therefore, it is still unclear whether predicted benthic distribution patterns, which emerged from theoretical or empirical models, are valid for estuarine systems globally. Their main inferences and conclusions may be biased and may obscure the actual understanding of estuarine systems. For instance, though such models are probably correct in discriminating significant broad-scale variation driven mainly by salinity, they are unable to explain marked discontinuities in benthic distribution and the prevalence of faunal or plant patches, so characteristic of estuarine systems.

To address some of these gaps in estuarine ecology, we have assessed the structural responses of intertidal benthic assemblages, expressed by variation in number of species, abundance and assemblage composition, to key environmental drivers in a subtropical estuary from southern Brazil. We have applied a hierarchical sampling design to assess benthic variation at each of several spatial scales, from meters to kilometers, along a marked estuarine gradient. We tested the hypothesis that if the general predictions of estuarine conceptual models are correct, variability in number of species, abundance and composition will be higher at large than small spatial scales along an estuarine salinity gradient.

1.2. Methods

1.2.1. Study area

The study was carried out in Guaratuba Bay, a subtropical estuarine system from southern Brazil (Figure 1). Guaratuba Bay is about 15 km long and 5 km wide

(Bigarella, 2001), with a surface area of 50.19 km² (Marone et al., 2006; Noernberg et al., 2008). The largest depths, down to 27 m, are found mainly at the entrance of the bay (Marone et al., 2006). Average water temperatures range from 22 ºC to 25 ºC during the rainy (December to May) and dry (June to November) seasons (Mizerkowski et al., 2012).

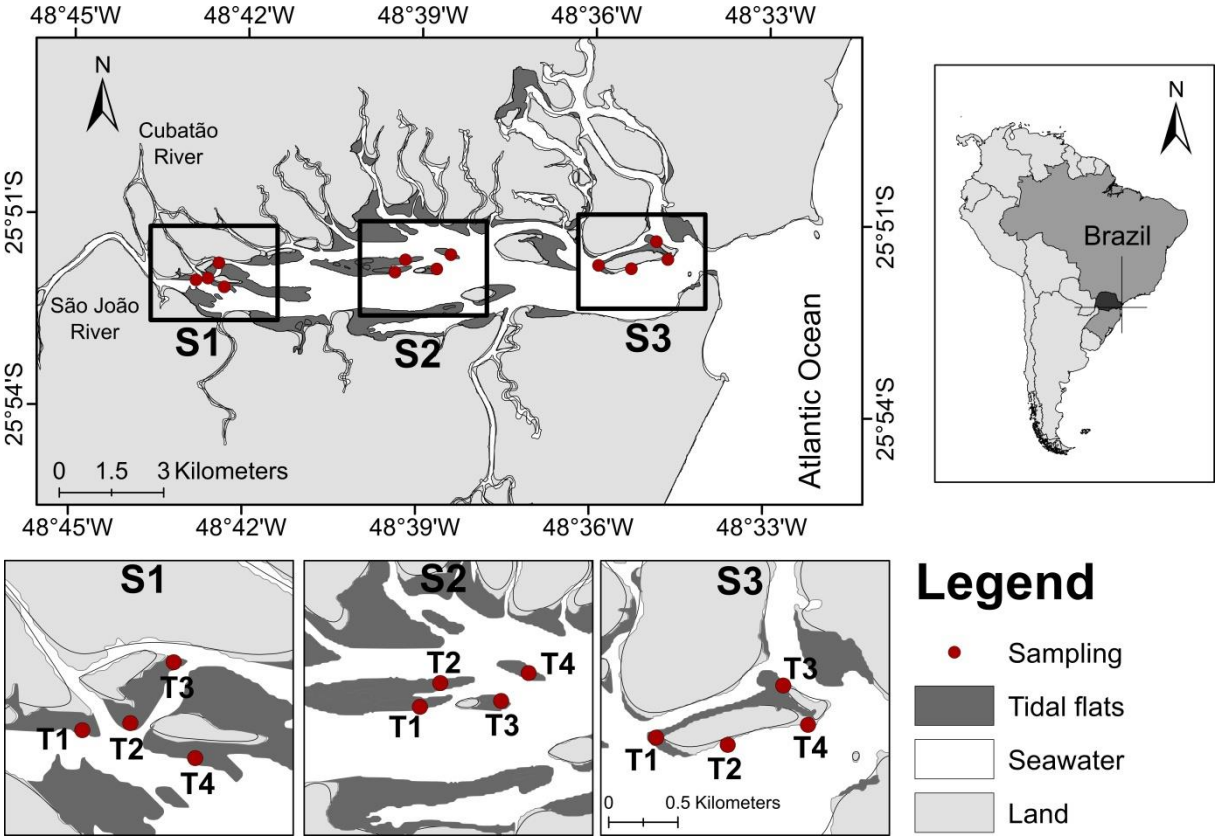

Fig. 1. Guaratuba Bay showing the extent of the intertidal flats along estuarine gradient. The circles are the tidal flats spatially nested sampled in the current research.

Tidal regime is microtidal, predominantly semidiurnal, and spring tides may reach up to 2 m in the inner estuarine sector (Marone et al., 2006). Salinity fluctuations are high, with horizontal and vertical highly stratified waters (Marone et al., 2006). The estuary is divided into three salinity sectors: an upper or inner sector dominated by riverine processes with average salinities ranging from 0 to 10, a central sector with oscillating mixing zones from about 10 to 25, and a lower or outer polyhaline to euryhaline sector, with salinities ranging from 23 to 34 (Mizerkowski et al., 2012). The larger regional rivers Cubatão and São João are located in the inner region, and drain unpolluted areas around Serra do Mar (“Mar mountain range”), with

a combined average annual discharge of about 80 $m^3 s^{-1}$ (Marone et al., 2006). The estuary has a dynamic scenario with strong currents (up to 2.3 m s^{-1}) and an estimated residence time of 9.3 days (Marone et al., 2006).

The estuarine system is surrounded by a mosaic of landscape features and ecosystems, including shallow tidal islands, tidal flats, river channels, well developed mangrove forests, seagrass stands and salt marshes. About 24% of the surface area along the estuarine main east-west axis is covered by extensive tidal flats, which are exposed during low tides (Marone et al., 2006; Noernberg et al., 2008). Local tidal flats are shallow (sometimes <1m during flood tide) and composed mainly of poorly sorted fine sand and silt (Cotovicz Junior et al., 2014).

Guaratuba Bay is considered one of the most pristine estuaries along the Brazilian southern coast, and classified as an Environmental Protection Area and priority site for marine biodiversity conservation in the country. However, there is evidence of increasing contamination levels from inland sources (Combi et al., 2013; Cotovicz Junior et al., 2014).

1.2.2. Sampling design and field procedures

A nested spatial design was applied to sample intertidal habitats along the main estuarine axis during 8 to 10 March 2012. Three sampling sectors (Figure 1), distanced in the scale of kilometers (about 5 to 6 km apart) were defined along the estuarine gradient: inner or oligohaline (S1), intermediate or mesohaline to polyhaline (S2) and outer or polyhaline to euryhaline (S3). Four tidal flats (T), distanced in the scale of hundreds of meters, were randomly selected in each sector. Tidal flats were carefully selected across the estuarine gradient to avoid the putative effects of lateral freshwater discharge from rivers and tidal creeks. Three locations (2 m x 2 m quadrats) distanced in the scale of tens of meters (10 - 30 m) and at similar tidal levels were stablished within each tidal flat. Three replicate faunal samples were randomly collected within each location, with a PVC core (15 cm in diameter to 10 cm depth).

Salinity and pH of percolating water were measured *in situ* at each location with a portable refractometer and pH meter, respectively. Surface sediment temperature was taken with a digital thermometer inserted to a 10 cm depth. Three measures of the width of the apparent redox discontinuity layer (RDL), used as a proxy for redox conditions of the sediment, were taken at each location with a ruler.

We considered the limit depth of the RDL as the boundary or transition from light color sediment (oxygen-rich layer) to grey or black (oxygen-poor layer) (Bianchi, 2007).

Sediment texture, organic matter (OM) and calcium carbonate ($CaCO_3$) contents were determined from one replicate sampled at each location with a PVC core (5 cm in diameter buried to 10 cm depth). One replicate with ~10 g of surface sediment was taken for nutrient analysis (total nitrogen, phosphorus and organic carbon). Another sediment replicate (~2 g) was taken to estimate photosynthetic pigments content. All sediment samples for biogeochemical analyses were taken to the laboratory under refrigerated and dark conditions, kept at -20^{o}C, then dried and macerated for further processing.

1.2.3. Laboratory procedures

Faunal samples were preserved in 4% formaldehyde and sieved using a 0.5 mm mesh screen. The retained material was stored in 70% ethanol – rose Bengal solution until sorting. For each sample, individuals were identified at species level or as morphospecies and counted.

The dry sediment samples for granulometry were treated with 1N of HCl and hydrogen peroxide (H_2O_2) to eliminate carbonates and organic matter, respectively. Particle size was measured by a laser diffraction analyzer (*Microtrac Inc*, Bluewave) and grain size ranges were classified following the Wentworth scale using Microtrac FLEX software. Sediment samples (~ 10 g dry weight) were treated with a 1 mol L^{-1} hydrochloric acid HCl solution for calcium carbonate ($CaCO_3$) analyses and the concentration was estimated by weight difference after acidification (Gross, 1971). Organic matter (OM) content was measured from ~10 g dry sediment subsamples and estimated by weight loss after oxidation with 10% H_2O_2 (Gross, 1971). Total organic carbon (TOC) was estimated following procedures described by Strickland and Parsons (1972) and adapted by Baumgaten et al. (1996), which are based on titration with ammoniacal ferric sulphate.

For analyses of total nitrogen (N) and phosphorus (P) content, 0.1 g of dried and macerated sediment was oxidized with potassium persulfate in a high pressure autoclave at 100°C for 30 minutes. Subsamples of 25 ml and 15 ml were used for total nitrogen and phosphorus determination, respectively, according to the colorimetric method described by Grasshoff et al. (1983). We assign “zero

concentration" when absorbance values fell below the limit of detection in the analysis procedures. Photosynthetic pigments were extracted from a sediment subsample of ~ 0.5 g with 10 ml of 100% acetone for 24 h in the dark, at 4°C. Afterwards, it was centrifuged at 3000 rpm for 20 minutes and then analyzed in a spectrophotometer. Chlorophyll-*a* and phaeopigments were determined by absorbance reads at 665 nm and 750 nm, before and after acidification of the sample with 1 ml of 1N HCL. Then, we applied the Lorenzen (1967) equation adapted by Sünback (1983) for sediments. All absorbance values were measured with a Shimadzu UV-1601PC spectrophotometer.

The molar N:P and C:N ratios were used to assess nutrient limitation and relative contribution of autochthonous and allochthonous inputs of organic matter along the estuarine gradient. Organic matter quality was determined by the ratio of phaeopigments to the sum of chlorophyll-a and phaeopigments (PAP ratio). It was calculated as an indication of the freshness or degradation conditions of the material deposited on the sediment (Boon et al., 1998).

1.2.4. Data analysis

Assemblage structure variables included taxa composition, number of species (measured as number of taxa, including unidentified species) and total abundance. Environmental variables included temperature, RDL, salinity, pH, chlorophyll-*a*, phaeopigments, TOC, OM, nitrogen, phosphorus, $CaCO_3$, median of grain size (50 percent point or median diameter), silt-clay content (percentage of sediment particles smaller than 63µm), molar N:P ratio, molar C:N ratio and PAP ratio.

A hierarchical analysis of variance (fully nested ANOVA) was carried out using number of species and abundance as dependent variables to assess the spatial variation between and within Sectors (fixed, three levels; inner, intermediate and outer), Tidal flats (random, four levels; nested in Sectors) and Locations (random, three levels; nested in Tidal flats with three cores as replicates). A simplified nested ANOVA was also applied to assess the differences in the environmental variables considering two spatial scales: Sectors (fixed, three levels; inner, intermediate and outer) and Tidal flats (random, four levels; nested in Sectors with three Locations as replicates).

We assessed the homoscedasticity with a Cochran's test with a significance level of 0.05. When violation of assumptions occurred, we transformed the data to decrease the asymmetry of the variance heterogeneity and ran the ANOVA tests which are robust when the design is balanced with appropriate replication, as recommended by Underwood (1997). Besides, a variance component analysis (VC%) was used to estimate the amount of variation for each source of spatial variability (Graham and Edwards, 2001). ANOVA tests were followed by *a posteriori* multiple comparison procedures using Student-Newman-Keuls test (SNK) in the case of terms significant at $p<0.05$.

The variability of macrofauna composition was assessed with multivariate analyses at different spatial scales along the estuarine gradient. The multivariate analyses were performed using Bray-Curtis similarity coefficients on fourth root transformed abundance data. A hierarchical Permutational Multivariate Analysis of Variance (PERMANOVA) was applied to test for any changes in the intertidal benthic assemblages (Anderson et al., 2008) caused by variations in taxa composition or abundance at different spatial scales along the estuarine gradient. We used the same factors from the ANOVAs, with three spatial scales. The test was performed under 9999 permutations and a level of significance at $p <0.05$, provided by a Monte Carlo asymptotic p-value. Variance components (VC%) were also estimated for each source of spatial variation. PERMANOVA test was followed by a posteriori pair-wise comparisons on terms in the model that were found to be significant at $p<0.05$. These data were represented graphically using non-metric multidimensional scaling (nMDS) plots to visualize main variation trends of benthic assemblages along the gradient.

Further, we carried out a Canonical Correspondence Analysis (CCA) to correlate the faunal responses to the main estuarine environmental drivers along the gradient. This analysis was performed with 36 samples from the environmental and species data matrix. We used the sum of replicates in each location for the numerically dominant species, which included the top 15 taxa (only taxa that represented more than 0.5% of overall abundance). We used an automatic stepwise selection model for the CCA, in which the term choice is based on Akaike's Information Criterion (AIC) by permutation tests. ANOVAs were performed to evaluate the significance of the canonical axes and vectors. The automatic stepwise selection model based on AIC selected the same environmental variables for complete data set (all species) and simplified data set (top 15 taxa in abundance).

Exploratory analyses indicated that the first five canonical axis and vectors were significant for both data set and displayed similar graphical layouts. So, we preferred to use a CCA with the simplified matrix since the complete species data matrix generated very crowded graphical results.

All statistical analyses and graphs, except the PERMANOVA (Anderson et al., 2008), were carried out using R environment for statistical computing (R Development Core Team 2014), with the packages “GAD” (Sandrini-Neto and Camargo, 2010), “sciplot” (Morales, 2012) and “vegan” (Oksanen et al., 2015).

1.3. Results

1.3.1. Spatial variation of environmental drivers

The variability increased with spatial scale for most environmental variables (Table 1, Figure 2). Variations of temperature, salinity, chlorophyll-*a*, phaeopigments, TOC, phosphorus, silt-clay content, grain size and C:N ratio were significant at the scales of hundreds of meters and kilometers. RDL, pH and OM differed significantly only among sectors (kilometers), while nitrogen and N:P ratio differed significantly among tidal flats (100s m). Calcium carbonate and PAP ratio variations did not differ significantly at any spatial scale along the estuarine gradient. In general, the largest proportion of total variance for most environmental variables was concentrated at larger spatial scales (the kilometer scale accounting for more than 40% of overall variation) and in a few cases at intermediate scales (100s m). However, the components of variation showed a marked contribution of smaller spatial scales to PAP ratio, OM and $CaCO_3$, of 100%, 45.48% and 49.74%, respectively (Table 1, Figure 2). This clearly indicates a patchy distribution among replicates (few meters within locations).

Salinity and pH formed a strong linear gradient, which increased from the inner to the outer sector (SNK, $p<0.001$, Figure 2), while depth of the redox discontinuity layer increased in the opposite direction (SNK, $p<0.001$, Figure 2). Grain size differed significantly among sectors (SNK, $p<0.01$, Figure 2): the inner sector had consistently higher proportions of medium sand, the intermediate sector of silt to very fine sand and the outer sector of very fine to fine sand. However, the highest levels of phaeopigments, TOC, phosphorus, OM and silt-clay content were the main variables discriminating the intermediate sector from the inner and outer sectors (SNK, $p<0.01$, Figure 2). Indeed, levels of chlorophyll-a and C:N ratio were

lowest in the inner and no significant differences were found between the intermediate and outer sectors (SNK, $p<0.01$, Figures 2).

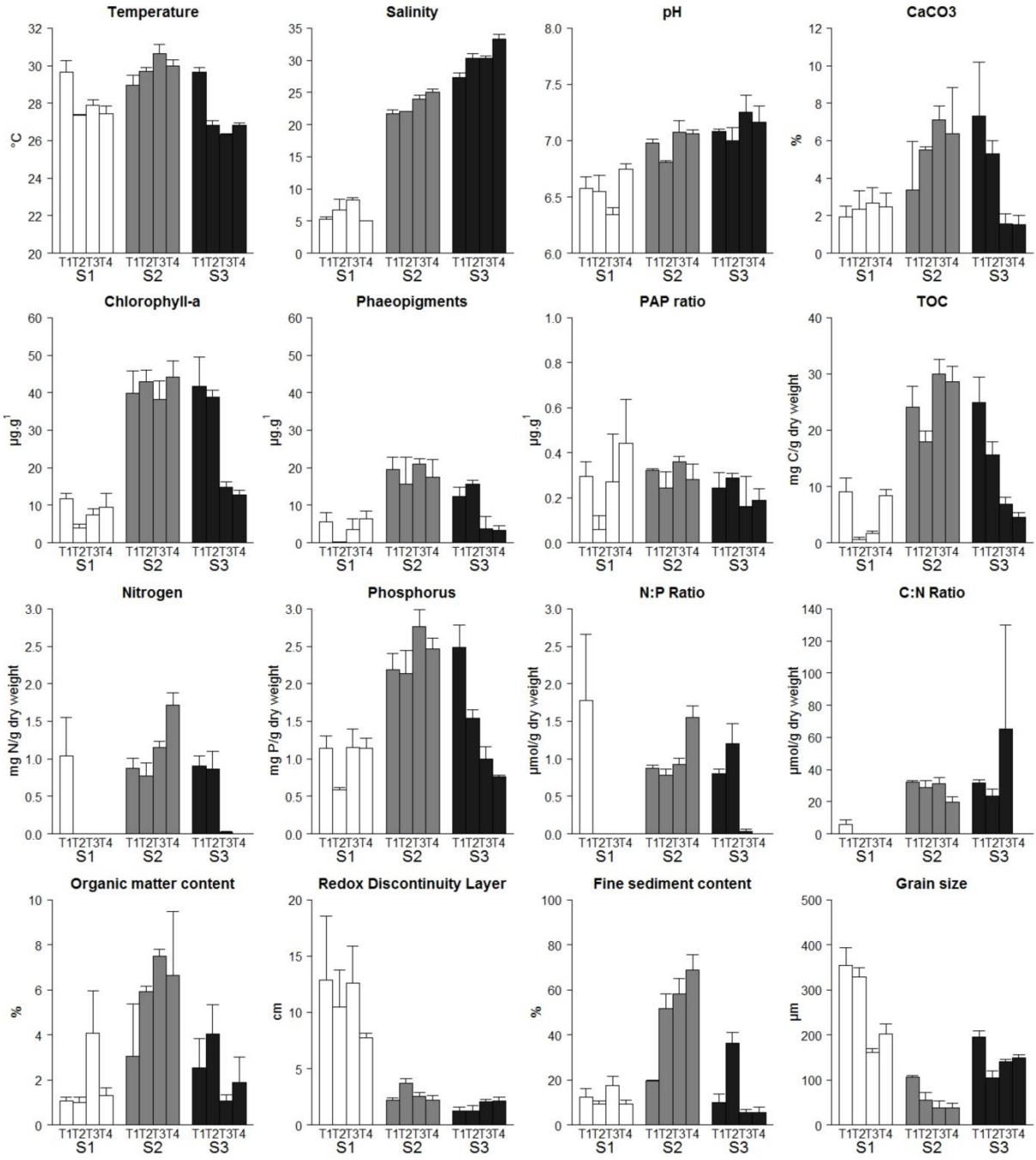

Fig. 2. Spatial variation represented by mean (±SE) for each environmental variable sampled along estuarine gradient on the subtropical system. Sectors were represented by colors (*white bars* = Sector 1, *grey bars* = Sector 2 and *black bars* = Sector 3) which included different tidal flats for each sector (T1, T2, T3 and T4). The zero values represent results that fell below the limit of detection in the analysis procedures.

Table 1

Results of the nested analyses of variance (MS = mean square, *F* values and significant level) performed for each environmental variable sampled along estuarine gradient on the subtropical system. We considered the spatial factors Sector (with three levels) and Tidal flats nested in Sector (with four levels). VC% = variance component as percentages of the total. *df* = degrees of freedom, MS= mean square, n = 3. Significance is shown at the ***p <0.001; **p <0.01; *p <0.05; ns=not significant.

		Temperature			**RDL**			**Salinity**			**pH**		
Source	df	MS	F-ratio	VC%	MS	F-ratio	VC%	MS	F-ratio	VC%	MS	F-ratio	VC%
Sector (km)	2	18.418	4.71 *	39.48	1.382	65.58 ***	64.26	1821.440	167.84 ***	80.47	1.070	19.64 ***	52.93
Tidal flats (100s m)	9	3.905	10.88 ***	39.03	0.021	0.6	0.00	10.850	7.37 ***	11.58	0.054	2.09	17.72
Location (10s m)	24	0.359		21.50	0.035		35.74	1.470		7.95	0.026		29.35
Total	35												
Transformation		no			fourth root			no			no		
Cochran's C test		ns			**			**			ns		

		Chlorophyll-*a*			**Phaeopigments**			**PAP Ratio**			**TOC**		
	df	MS	F-ratio	VC%	MS	F-ratio	VC%	MS	F-ratio	VC%	MS	F-ratio	VC%
Sector (km)	2	3325.700	13.11 **	51.62	21.087	7.65 *	41.62	0.020	0.66	0.00	1250.680	9.28 **	48.16
Tidal flats (100s m)	9	253.600	5.75 ***	26.96	2.753	3.06 *	26.49	0.031	0.96	0.00	134.660	7.94 ***	31.28
Location (10s m)	24	44.100		21.42	0.897		31.89	0.032		100.00	16.950		20.56
Total	35												
Transformation		no			square root			no			no		
Cochran's C test		ns			ns			ns			ns		

		Nitrogen			**Phosphorus**			**N:P Ratio**			**C:N Ratio**		
	df	MS	F-ratio	VC%	MS	F-ratio	VC%	MS	F-ratio	VC%	MS	F-ratio	VC%
Sector (km)	2	2.499	3.53	33.39	5.980	8.00 *	45.40	1.873	4.03	36.18	12.124	7.98 *	42.34
Tidal flats (100s m)	9	0.706	6.75 ***	38.68	0.747	6.69 ***	31.64	0.464	8.36***	38.96	1.519	3.18 *	26.54
Location (10s m)	24	0.105		27.93	0.112		22.97	0.055		24.86	0.477		31.12
Total	35												
Transformation		no			no			fourth root			fourth root		
Cochran's C test		***			ns			***			***		

		CaCO3			**Organic matter content**			**Silt-clay content**			**Grain size**		
	df	MS	F-ratio	VC%	MS	F-ratio	VC%	MS	F-ratio	VC%	MS	F-ratio	VC%
Sector (km)	2	31.355	2.87	25.84	54.281	7.19 *	38.37	5304.7	7.76*	47.28	218.382	14.14**	54.57
Tidal flats (100s m)	9	10.893	1.72	24.43	7.545	0.25	16.15	684	12.51***	34.90	15.445	9.46***	28.47
Location (10s m)	24	6.319		49.74	5.474		45.48	54.7		17.82	1.632		16.96
Total	35												
Transformation		no			no			no			square root		
Cochran's C test		ns			ns			ns			ns		

1.3.2. Spatial variation of faunal assemblages

We recorded 75 taxa of benthic macroinvertebrates (Supplementary Table A). Numerically dominant taxa displayed distinct distribution patterns along the estuarine gradient, or among sectors (Figure 3). The numerically dominant taxa in the inner sector were crustaceans (mainly the amphipod *Monochorophium acherusicum*, unidentified ostracods, the tanaids *Monokalliapseudes schubarti* and *Sinelobus stanfordi*) and chironomid larvae. Polychaetes (mainly *Laeonereis pandoensis* and *Nephtys fluviatilis*) were more diverse and abundant, together with unidentified ostracods and oligochaetes, in the intermediate sector. Polychaetes (mainly *Aricidea* spp., *Capitella* sp. and *Streblospio* cf. *benedicti*) were more diverse and numerically dominated the outer sector, together with the gastropod *Heleobia australis*.

Number of species did not vary significantly at the largest scale, which corresponded to the estuarine gradient (Table 2, Figure 3). Spatial patterns of variation in number of species were only significantly greater at the scale of 100s m (among tidal flats within sectors), with a higher contribution to the overall variance (~44%). The smaller spatial scale was also relevant and accounted for about 40% of total variation (i.e., among replicated cores a few meters apart within each location). Total abundance, in contrast, had a distinct spatial pattern, varying significantly at all scales (Table 2), mainly among tidal flats (100s m) and locations (10s m). However, the scales of kilometers (among sectors) and hundreds of meters (among tidal flats within sector) also accounted for a high percentage of the overall variance, about 36% and 34%, respectively. Abundance was higher in the inner sector in comparison with both intermediate and outer sectors (SNK, $p<0.05$, Figure 3).

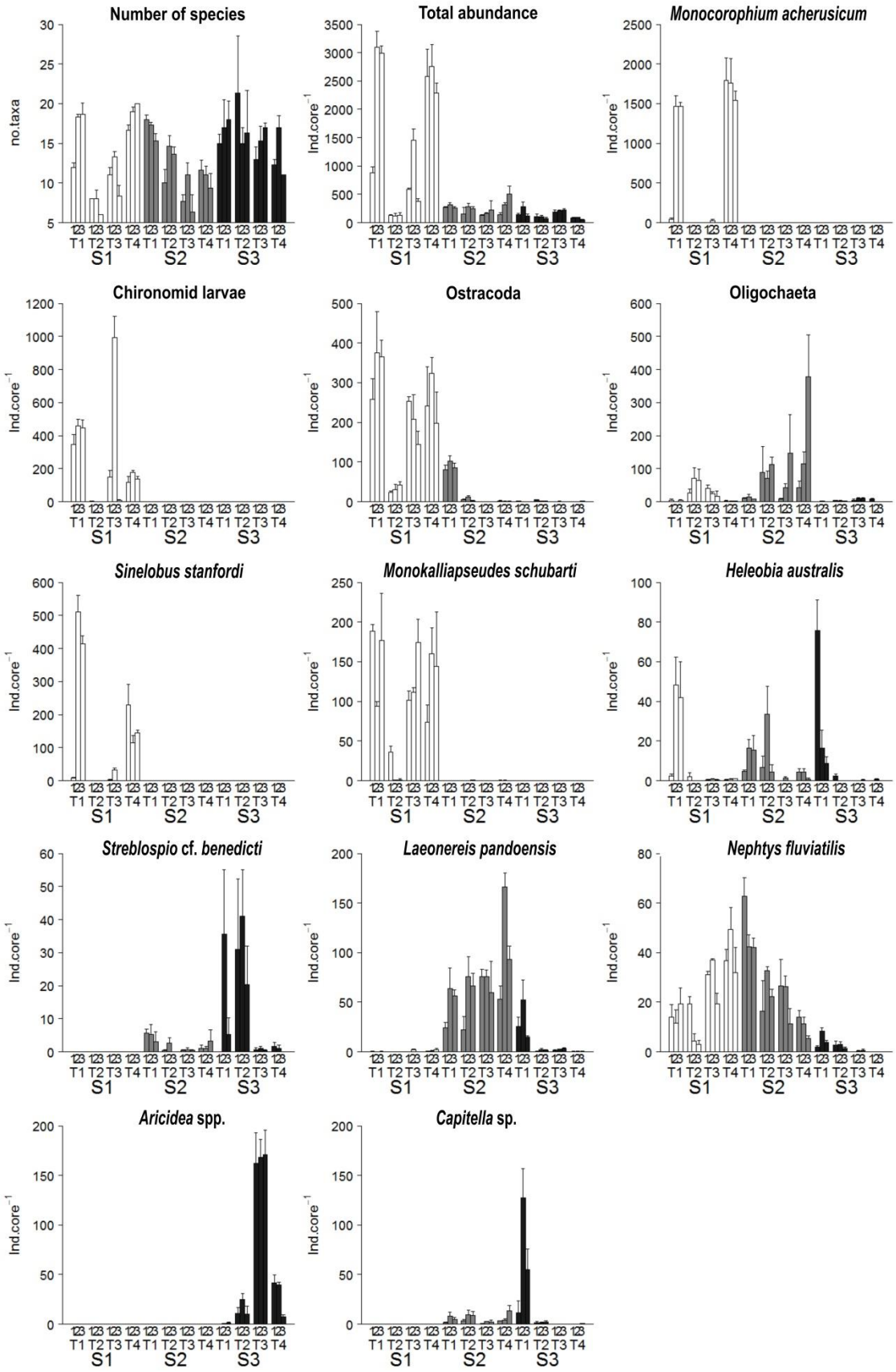

Fig. 3. Spatial variation represented by mean (±SE) for number of species, total abundance and individual taxa abundance from intertidal benthic fauna sampled along estuarine gradient on the subtropical system. Sectors were represented by colors (*white bars* = Sector 1, *grey bars* = Sector 2 and *black bars* = Sector 3) which

included different tidal flats for each sector (T1, T2, T3 and T4) and location (1, 2 and 3).

Table 2
Results of the nested analyses of variance (MS = mean square, *F* values and significant level) performed for number of species and total abundance from macrofauna sampled along estuarine gradient on the subtropical system. Spatial factors considered were Sector (with three levels), Tidal flats nested in Sector (with four levels) and Location nested in Tidal flats and Sector (with three levels). VC% = variance component as percentages of the total. *df* = degrees of freedom, MS = mean square, n = 3. Significance is shown at the ***p <01; **p <0.01; *p <0.05; ns=not significant.

		Number of species			**Total abundance**		
Source	df	MS	F-ratio	VC%	MS	F-ratio	VC%
Sector (km)	2	0.606	0.80	0.00	5165.40	4.98 *	35.85
Tidal flats (100s m)	9	0.749	8.08 ***	43.59	1037.00	11.29 ***	34.31
Location (10s m)	24	0.093	1.53	16.71	91.80	6.19 ***	16.96
Residual (m)	72	0.061		39.70	14.80		12.88
Total	107						
Transformation		log (x+1)			square root		
Cochran's C test		**			*		

Spatial variation patterns in benthic assemblage composition were consistent with variation patterns in total abundance, with significant differences at all spatial scales (Table 3). However, the largest scales (among sectors along the estuarine gradient) had the highest contribution to overall variability, accounting for about 51% of variance in assemblage composition. Pairwise a posteriori comparisons indicate that assemblages differed significantly among the three sectors ($p<0.01$). This spatial gradient was evidenced by faunal distribution patterns in the nMDS analysis (Figure 4), in which the sectors were separated from each other. However, overlapping samples between the inner and intermediate sectors, and between the intermediate and outer sectors may represent a gradual and continuous transition of assemblage composition along the estuarine gradient. The outer sector displayed the highest variability and dissimilarity among tidal flats (hundreds of meters) and locations (ten of meters).

Table 3
Summary of multivariate analyses of variance (PERMANOVA) based on the Bray–Curtis dissimilarities with fourth root transformed data performed for macrofaunal assemblages sampled along estuarine gradient on the subtropical system. Spatial factors considered were Sector (with three levels), Tidal flats nested in Sector (with four levels) and Location nested in Tidal flats and Sector (with three levels). VC% = variance component as percentages of the total. *df* = degrees of freedom, MS = mean square, n = 3 replicates, 9999 permutations. *p* values calculated through the Monte Carlo permutation test. Significant terms of interest (α = 0.05) are highlighted in bold.

Source	**df**	**MS**	***Pseudo-F***	**p**	**VC%**
Sector (km)	2	62676	7.5287	**0.0001**	50.62
Tidal flats (100s m)	9	8325	8.0004	**0.0001**	27.13
Location (10s m)	24	1040.6	2.1895	**0.0001**	6.32
Residual (m)	72	475.26			15.93
Total	107				

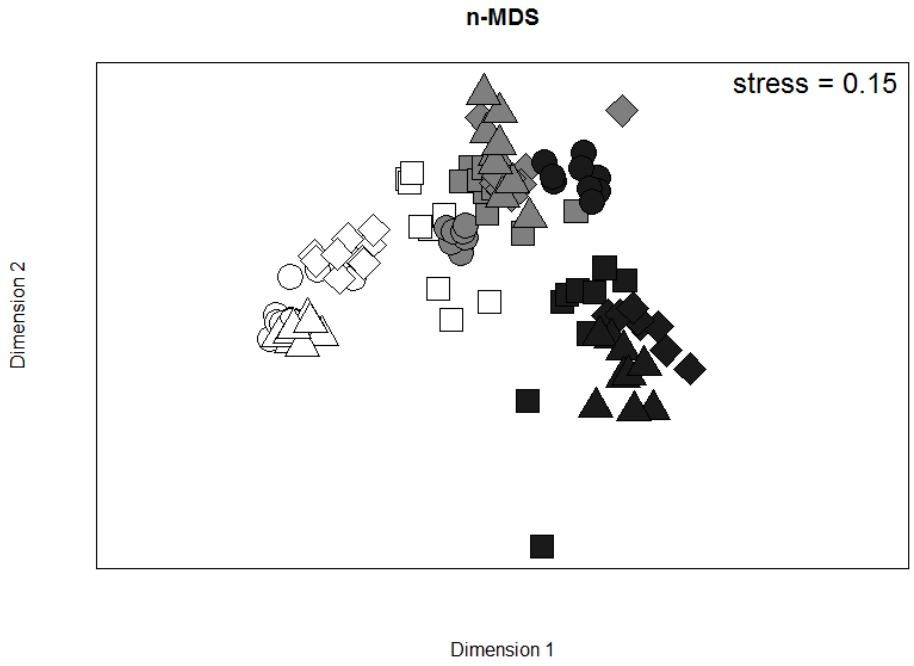

Fig. 4. Benthic assemblages represented by nMDS ordination at different spatial scales along estuarine gradient on the subtropical system. Sectors were performed by colors (*white* = Sector 1, *grey* = Sector 2 and *black* = Sector 3) and tidal flats by symbols (T1 = *circle*, T2 = *square*, T3 = *diamond* and T4 = *triangle*).

1.3.3. Relationships between environmental drivers and faunal assemblages

Variability in faunal abundance as displayed by CCA was explained by salinity, pH, chlorophyll-*a*, silt-clay content and phosphorus content in surface sediment (Supplementary Table B). The first canonical axis explained about 26% of

total variance and the second axis about 17% (Figure 5). Furthermore, the ANOVA indicated that the variance explained by the axes was significant ($p<0.01$ for the four first axes, Supplementary Table B).

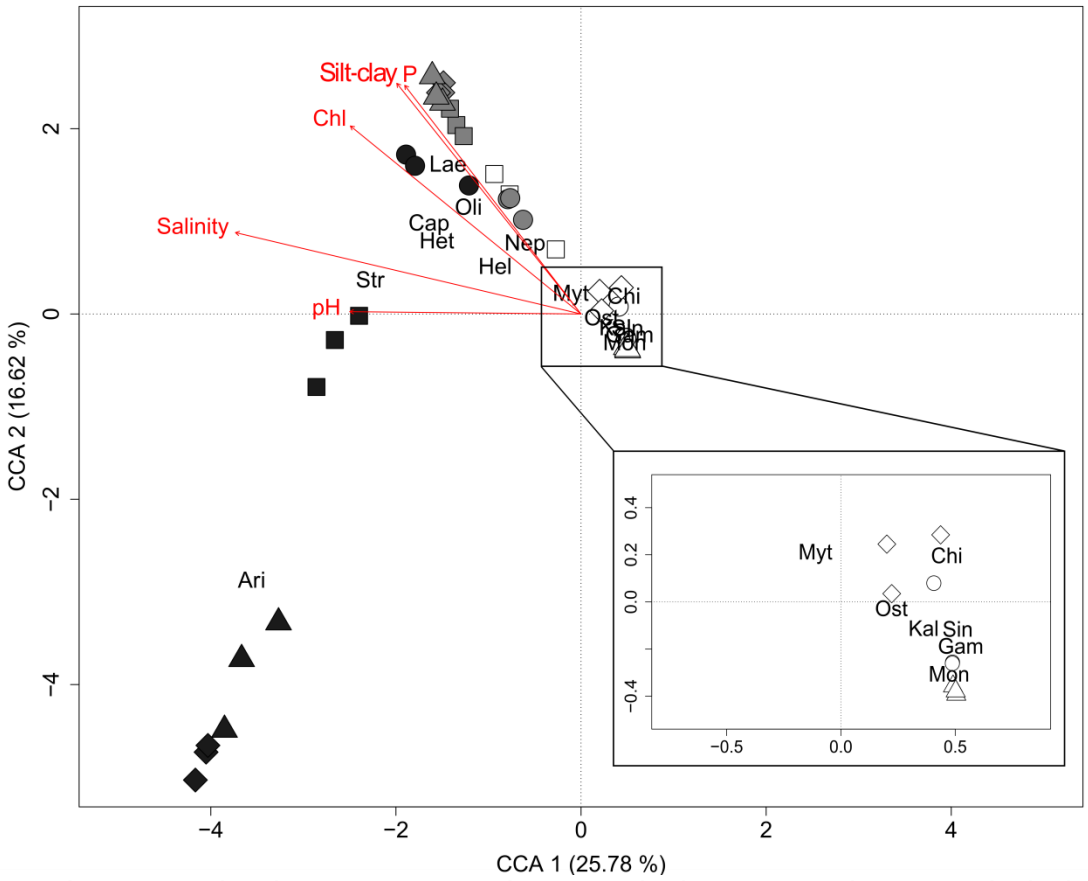

Fig. 5. Diagram of the first two axes of the canonical correspondence analysis (CCA) performed with environmental and species matrix at different spatial scales along estuarine gradient on the subtropical system. The descriptors (environmental variable) are represented by vectors, sectors by colors (*white* = Sector 1, *grey* = Sector 2 and *black* = Sector 3) and tidal flats by symbols and numbers (T1 = *circle*, T2 = *square*, T3 = *diamond* and T4 = *triangle*). Vectors: P = phosphorus; Silt-clay = silt-clay content; Chl = chlorophyll-*a*; pH and Salinity. Species: Mon = *Monochorophium acherusicum*; Gam = Gammaridea sp.1; Kal = *Monokalliapseudes schubarti*; Sin = *Sinelobus stanfordi*; Ost = unidentified ostracods; Chi: chironomid larvae; Myt = *Mytella guayanensis*; Hel = *Heleobia australis*; Oli = unidentified oligochaetes; Nep = *Nephtys fluviatilis*; Cap = *Capitella* sp.; Het = *Heteromastus* cf. *similis*; Lae = *Laeonereis pandoensis*; Str = *Streblospio* cf. *benedicti*; Ari = *Aricidea* spp.

CCA showed clear spatial gradient trends in faunal distribution, mainly due to salinity and pH. Additionally, each sector along the estuarine gradient was represented by the dominant taxa. However, the CCA also showed that the samples and some taxa related to the inner sector (chironomid larvae, ostracods, the amphipods *M. acherusicum* and Gammaridea, the tanaids *M. schubarti* and *S.*

stanfordi, and the bivalve *Mytella guyanensis*) were close to the origin of axes 1 and 2, or the weakest explanation region of the model. Phosphorus, silt-clay content and chlorophyll-*a* were positively correlated with the increasing abundance of gastropod *H. australis*, oligochaetes and polychaetes *N. fluviatilis*, *Heteromastus* sp., *L. pandoensis* and *Capitella* sp. towards the intermediate sector. Abundances of polychaete *S. benedicti* were positively correlated to high salinity mainly associated with the outer sector.

The CCA also indicated that abundance patterns of *Aricidea* spp. did not respond significantly to any environmental variables in the outer sector. This effect was driven by the highest abundance variability among tidal flats (hundreds of meters) and locations (ten of meters). Distribution and abundance of this taxon may vary considerably in response to unchecked drivers or in response to stochastic processes. In addition, samples from distinct sectors also overlapped, as in the nMDS plot, again suggesting smooth spatial transitions along the estuarine gradient.

1.4. Discussion

Our study has emphasized the importance of incorporating small spatial scales into a hierarchized sampling design to explain the distribution of intertidal benthic assemblages along a subtropical estuarine gradient. The hypothesis that benthic variables will mostly vary at the largest spatial scale (or at the salinity gradient of kilometers) was not refuted for total abundance and species composition. Potential environmental drivers, such as salinity, pH, nutrient concentrations, chlorophyll-*a* levels, grain size, silt-clay content and redox discontinuity layer also varied at the largest spatial scale. Benthic distribution patterns thus result from a complex interaction among environmental drivers, including salinity. However, although total abundance and assemblage composition varied significantly from hundreds of meters to kilometers, variations in number of species could not be explained by the “broad-scale hypothesis” or salinity-based estuarine models.

Although not all environmental drivers fit a gradient of linear variation, our results did support the division of the estuary in inner, intermediate and outer sectors, as previously reported for Guaratuba Bay (Marone et al., 2006; Mizerkowski et al., 2012). However, overlapping gradients created by environmental drivers at larger or smaller scales variously affect the benthic compartments along the main estuarine axis. Estuarine communities are considered less diverse and more abundant than

marine ones, as well as more tolerant to stressful conditions (Elliott and Quintino, 2007). The oligohaline region in the inner sector of Guaratuba Bay did display this well-known abundance pattern. Non-tolerant organisms were excluded, and salinity indeed acted as a primary structuring factor. Such decrease in faunal abundance from freshwater to marine habitats was not consistent with other estuarine surveys (Giménez et al., 2005; Quintino et al., 2011; Barnes and Ellwood, 2012), although a similar pattern was reported for a temperate estuarine system in South America (Cortelezzi et al., 2007).

However, number of species was similar among sectors and did not follow or varied with the salinity gradient. The spatial patterns in the number of species did not corroborate any other positive or negative relationships with salinity as reported along estuarine systems worldwide (Giménez et al., 2005; Quintino et al., 2011; Barnes and Ellwood, 2012). The observed variation patterns in local intertidal assemblages were inconsistent with the alternative linear model proposed by Attrill (2002) who suggested a decrease in the number of species towards the maximum salinity range, which corresponds to the mid-estuary region of a temperate system. Conceptual estuarine models for variation in the number of species (Whitfield et al., 2012) did not explain our observed spatial patterns either.

Thus, non-linear biological responses along the linear environmental gradients resulted from complex gradient patterns, previously suggested for other transitional systems, as coastal lagoons (Benedetti-Cecchi et al., 2001; De Biasi et al., 2003; Pérez-Ruzafa et al., 2007). Most variation in number of species occurred at the tidal flats scale (hundreds of meters apart) and secondarily at smaller spatial scales (among replicates a few meters apart). Further small-scale variability in number of species can reflect the occasional variation in the number of rare species among replicates just a few meters apart. Carbon, nitrogen, phosphorus, photosynthetic pigments and silt-clay content, rather than salinity, could act as drivers of the observed variations in number of species, since they also varied at the tidal flat scale. Nutrient contents are key structuring factors of the benthic fauna in many soft-sediment habitats (Gray and Elliott, 2009). Organic input from natural sources may play an important role in resource supply and support different macrofaunal assemblages (Elliott and Quintino, 2007; Elliott and Whitfield, 2011). Thus assemblages can vary among different estuarine habitats mainly due to their feeding

strategies and physiological tolerances (Attrill and Rundle, 2002; Elliott and Quintino, 2007; Gray and Elliott, 2009).

Total abundance comparisons at different spatial scales may be potentially confounded due to distinct taxa patterns. Several numerically dominant taxa displayed a segregated distribution along different estuarine sectors while others were limited to neighboring sectors or widely distributed along the whole estuarine gradient. The high abundances of the amphipod *M. acherusicum*, chironomid larvae, the tanaids *M. schubarti* and *S. stanfordi* restricted to the inner sector and of *Aricidea* spp. to the outer sector suggest a strong influence from salinity on their distribution and that they are either freshwater or marine specialists, respectively. Ostracods, oligochaetes, polychaetes *L. pandoensis*, *N. fluviatilis* and the gastropod *H. australis* were the numerically dominant taxa distributed along the entire salinity range, from freshwater to marine habitats, providing reliable clues of the extent to which intertidal macrofauna assemblages might vary along an estuarine gradient. The variation in abundance at larger spatial scales is likely to result from the marked variation in environmental stress already reported for many estuarine systems (Elliott and Quintino, 2007; Elliott and Whitfield, 2011). Segregation and restricted distribution of a species or taxonomic group to a specific salinity range and sediment patches (Barros et al., 2008; Barnes and Ellwood, 2012; Giménez et al. 2014) are spatial patterns commonly reported in the literature.

Our results provide additional support to the ecological niche concept along a subtropical estuarine gradient. The actual number of dimensions that defines the niche for any species is related to the number of environmental variables that affect the species (Gray and Elliott, 2009). The environmental gradient formed by a number of benthic drivers besides salinity conditioned distribution patterns of the whole assemblage or individual species. The actual distribution of intertidal benthic assemblages reflected the relevance at all spatial scales, though the largest spatial scales from hundreds of meters to kilometers accounted for most of the total variation. These patterns were clearly supported by the graphical analyses (MDS and CCA) in which boundaries among the sectors moderately overlapped (i.e., inner and intermediate, intermediate and outer) along the estuarine gradient. This suggests that macrofauna distribution along this subtropical estuarine system partially coincide with the ecocline model proposed for a temperate estuary (Attrill and Rundle, 2002). According to this model, benthic fauna would occupy two overlapping gradients or

stressors (i.e. two-ecocline), one from freshwater to middle-estuary and the other from marine habitats to middle-estuary.

Benthic variation or patchiness at the smallest spatial scales should not be considered simply as uninteresting “noise” (Carroll, 2003). This marked small-scale variability is a congruent pattern for most benthic habitats (Morrissey et al., 1992; Underwood et al., 2000) and clearly affects benthic indices currently used to assess estuarine systems (Muniz et al., 2012; Brauko et al., 2015). Variability in benthic populations may be typically patchy in distribution and abundance due to changes in external (patterns of recruitment and disturbances) and internal (requirements for habitat, mortality rate and predation) processes to the assemblage (Underwood et al., 2000).

In summary, our findings do not fully support previous estuarine models of linear variation in the number of species along estuarine salinity gradients. The reasons for the divergences between empirical or conceptual models and observed trends are not obvious. They may simply result from sampling artifacts (i.e., core and grab sampler) or differences in sampling designs (i.e., the use of non-nested designs) in ways yet to be recognized. Besides the potential role played by salinity, variation of other environmental drivers at the largest scale (pH, grain size, silt-clay content, redox discontinuity layer, carbon, phosphorus and photosynthetic pigments) could also act as structuring drivers of benthic intertidal assemblages. This multivariate framework makes it difficult to determine which potential driver(s) better explain estuarine benthic variability. The relative importance of these environmental drivers will depend on the involved benthic compartments (epifauna and endofauna) and habitats (subtidal and intertidal). Quintino et al. (2009, 2011) reported quantitative differences between epifauna (collected with leaf-bags avoiding grain-size effects) and endofauna (collected with hand-core in the sediment) along a full salinity gradient. Intertidal estuarine organisms are subjected to additional environmental stress conditions and consequently larger variability may be expected at small scales, mainly due to sediment instability, temporary desiccation, high and low salinity due to evaporation and rainfall (Gray and Elliott, 2009; Elliott and Whitfield, 2011). Non-nested descriptive ecological approaches based on linear sampling designs cannot reliably discriminate the relative contribution of environmental drivers to benthic variability within an estuarine gradient, which may vary considerably at different scales. Therefore, it is problematic to generalize benthic patterns in

transitional waters already highly variable due to such strong environmental gradients (Elliott and Quintino, 2007; Elliott and Whitfield, 2011). Our results may provide useful data for future macroecological approaches. They also have practical implications for future monitoring programs of transitional coastal waters globally. Without apropriatte replication at a hierarchy of spatial scales, ecological processes and changes (natural or anthropogenic) in an estuarine gradient cannot be inferred from the patterns and subsequently tested experimentally at the relevant scale. We suggest that the development of reliable conceptual models for estuaries worldwide still depends on the application of multiscale approaches. Such designs, still scant in estuarine ecology, are much needed to classify transitional waters, to assess interactions between environmental drivers and benthic communities at different estuarine typologies and to assess the ecological status of estuarine systems.

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Appendix A. Supplementary data

Supplementary Table A
List of the benthic taxa with average abundance (mean ± SE) and relative abundances (%) found in the each sector sampled along estuarine gradient on the subtropical system. The top 5 value for each sector are highlighted in bold.

	S1		S2		S3	
Taxa	**Ind.core^{-1}**	**%**	**Ind.core^{-1}**	**%**	**Ind.core^{-1}**	**%**
Cnidaria						
Edwardsiidae	0.03 ± 0.03	0.002	3.72 ± 1.15	1.47	0.42 ± 0.18	0.30
Polyp	0.81 ± 0.29	0.06	0 ± 0	0	0 ± 0	0
Phoronida						
Phoronis sp.	0 ± 0	0	0.03 ± 0.03	0.01	0.25 ± 0.11	0.18
Nemertea	0.22 ± 0.13	0.02	0.53 ± 0.15	0.21	0.75 ± 0.16	0.54
Hirudinea	0.03 ± 0.03	0.002	0 ± 0	0	0 ± 0	0
Oligochaeta	21.33 ± 5.45	1.47	**86.17 ± 21.51**	**34.13**	3.5 ± 0.74	2.51
Polychaeta						
Alitta succinea	0 ± 0	0	0.08 ± 0.05	0.03	0.17 ± 0.07	0.12
Aricidea cf. *albatrossae*	0 ± 0	0	0 ± 0	0	**53.14 ± 11.79**	**38.07**
Aricidea cf. *fragilis*	0 ± 0	0	0 ± 0	0	0.53 ± 0.3	0.38
Armandia hossfeldi	0.03 ± 0.03	0.002	0 ± 0	0	1.75 ± 0.6	1.25
Boccardiella cf. *truncata*	0.06 ± 0.06	0.004	0 ± 0	0	0 ± 0	0
Capitella sp.	0 ± 0	0	5.22 ± 0.9	2.07	**16.69 ± 6.7**	**11.96**
Capitellidae	0 ± 0	0	0 ± 0	0	0.03 ± 0.03	0.02
Diopatra sp.	0 ± 0	0	0 ± 0	0	0.06 ± 0.04	0.04
Dipolydora socialis	0.06 ± 0.04	0.004	0 ± 0	0	0 ± 0	0
Glycinde multidens	0 ± 0	0	0 ± 0	0	0.81 ± 0.17	0.58
Goniada littorea	0 ± 0	0	0 ± 0	0	0.03 ± 0.03	0.02
Hermundura tricuspis	0 ± 0	0	0 ± 0	0	1.17 ± 0.2	0.84
Heteromastus cf. *similis*	0.86 ± 0.26	0.06	**9.97 ± 1.45**	**3.95**	4.08 ± 0.96	2.93
Isolda pulchella	0 ± 0	0	0.33 ± 0.11	0.13	0.97 ± 0.21	0.70
Laeonereis pandoensis (=*L. culveri*)	0.5 ± 0.16	0.03	**69.39 ± 7**	**27.49**	**8.72 ± 2.99**	**6.25**
Leiocapitellides sp.	0 ± 0	0	0 ± 0	0	0.08 ± 0.05	0.06
Magelona papillicornis	0 ± 0	0	0 ± 0	0	1.47 ± 0.41	1.05
Mediomastus sp.	0.03 ± 0.03	0.002	0 ± 0	0	4.56 ± 0.86	3.26
Nephtys fluviatilis	23.08 ± 2.62	1.59	**26.11 ± 3.05**	**10.34**	1.83 ± 0.44	1.31
Nereis sp.	0 ± 0	0	0.03 ± 0.03	0.01	0 ± 0	0
Odontosyllis sp.	0 ± 0	0	0 ± 0	0	0.08 ± 0.08	0.06
Oxydromus sp.	0 ± 0	0	0 ± 0	0	0.03 ± 0.03	0.02
Scoloplos cf. *rubra*	0 ± 0	0	0 ± 0	0	0.33 ± 0.13	0.24
Sigambra grubii	0 ± 0	0	1.42 ± 0.3	0.56	1.97 ± 0.33	1.41
Spiophanes duplex	0 ± 0	0	0 ± 0	0	0.17 ± 0.07	0.12
Streblospio cf. *benedicti*	0 ± 0	0	1.97 ± 0.52	0.78	**11.5 ± 3.5**	**8.24**
Spionidae	0 ± 0	0	0 ± 0	0	0.03 ± 0.03	0.02
Bivalvia						
Anomalocardia flexuosa	0 ± 0	0	0 ± 0	0	4.03 ± 1.08	2.89

Corbula sp.	0 ± 0	0	0 ± 0	0	0.08 ± 0.05	0.06
Juvenile bivalves	0 ± 0	0	0.03 ± 0.03	0.01	0 ± 0	0
Lucina pectinata	0.03 ± 0.03	0.002	0.06 ± 0.04	0.02	0.36 ± 0.13	0.26
Macoma tenta	4.44 ± 1.16	0.31	0 ± 0	0	0 ± 0	0
Mytella guayanensis	17.69 ± 3.48	1.22	5.83 ± 1.24	2.31	2.03 ± 0.55	1.45
Pitar cf. *fulminata*	0 ± 0	0	0 ± 0	0	0.08 ± 0.08	0.06
Tagelus cf. *plebeius*	0 ± 0	0	0.06 ± 0.04	0.02	0.39 ± 0.16	0.28
Tagelus divisus	0 ± 0	0	0 ± 0	0	2.67 ± 0.52	1.91
Tellina cf. *versicolor*	0 ± 0	0	0.47 ± 0.14	0.19	0.06 ± 0.04	0.04
Tellina sp.	0 ± 0	0	0.08 ± 0.05	0.03	1.89 ± 0.61	1.35
Macoma constricta	0 ± 0	0	0 ± 0	0	0.69 ± 0.25	0.50
Gastropoda						
Bulla sp.	0 ± 0	0	0 ± 0	0	0.11 ± 0.05	0.08
Epitonium cf. *celesti*	0 ± 0	0	0 ± 0	0	0.03 ± 0.03	0.02
Heleobia australis	8.17 ± 3.22	0.56	7.64 ± 2.02	3.03	**8.67 ± 3.73**	**6.21**
Neritina virginea	0 ± 0	0	0 ± 0	0	0.03 ± 0.03	0.02
Solariorbis shumoi	0 ± 0	0	0.03 ± 0.03	0.01	0.22 ± 0.15	0.16
Stramonita haemastoma	0 ± 0	0	0 ± 0	0	0.03 ± 0.03	0.02
Amphipoda						
Corophiidae	0.83 ± 0.31	0.06	0 ± 0	0	0 ± 0	0
Gammaridea sp.1	9.19 ± 3.33	0.64	0 ± 0	0	0 ± 0	0
Gammaridea sp.2	0 ± 0	0	1.42 ± 0.68	0.56	0 ± 0	0
Monocorophium acherusicum	**674.97 ± 137.58**	**46.63**	0 ± 0	0	0.06 ± 0.04	0.04
Senticaudata	0 ± 0	0	4.17 ± 1.27	1.65	0.67 ± 0.27	0.48
Isopoda						
Cassidinidea fluminensis	2.44 ± 0.59	0.17	0 ± 0	0	0 ± 0	0
Pseudosphaeroma cf. *jakobii*	3.69 ± 1.01	0.26	0.03 ± 0.03	0.01	0 ± 0	0
Uromunna cf. *peterseni*	2.86 ± 0.89	0.20	0.03 ± 0.03	0.01	0 ± 0	0
Tanaidacea						
Monokalliapseudes schubarti	**105.25 ± 12.99**	**7.27**	0.11 ± 0.05	0.04	0 ± 0	0
Sinelobus stanfordi	**121.72 ± 29.22**	**8.41**	0 ± 0	0	0 ± 0	0
Ostracoda	**205.33 ± 24.15**	**14.19**	**24.47 ± 6.61**	**9.69**	1.14 ± 0.26	0.82
Brachyura						
Megalopa	1.58 ± 0.33	0.11	0.28 ± 0.09	0.11	0.08 ± 0.05	0.06
Portunidae	0.19 ± 0.1	0.01	0 ± 0	0	0.14 ± 0.06	0.10
Uca thayeri	0.03 ± 0.03	0.002	1.78 ± 0.35	0.70	0.03 ± 0.03	0.02
Xanthidae	0.83 ± 0.26	0.06	0.33 ± 0.14	0.13	0.25 ± 0.11	0.18
Alpheus sp.	0 ± 0	0	0.17 ± 0.06	0.07	0.31 ± 0.1	0.22
Insecta						
Acari	0.08 ± 0.05	0.01	0 ± 0	0	0.03 ± 0.03	0.02
Ceratopogonidae	0.03 ± 0.03	0.002	0.28 ± 0.15	0.11	0.03 ± 0.03	0.02
Chironomidae	**236.56 ± 48.45**	**16.34**	0.06 ± 0.04	0.02	0.08 ± 0.06	0.06
Colembola	0 ± 0	0	0 ± 0	0	0.03 ± 0.03	0.02
Heteroptera	0.03 ± 0.03	0.002	0 ± 0	0	0 ± 0	0
Insect larva	0.03 ± 0.03	0.002	0 ± 0	0	0 ± 0	0

Pupae of Diptera	3.28 ± 0.63	0.23	0.06 ± 0.06	0.02	0.25 ± 0.13	0.18
Sciomyzidae	0.03 ± 0.03	0.002	0 ± 0	0	0 ± 0	0
Trichoptera 1	1.06 ± 0.42	0.07	0 ± 0	0	0 ± 0	0
Trichoptera 2	0.14 ± 0.07	0.01	0 ± 0	0	0 ± 0	0
Total	1448.06 ± 203.54	78.69	252.4 ± 24.47	13.72	139.6 ± 14.14	7.59

Supplementary Table B

Summary of test model results for canonical correspondence analysis (CCA) which included all environmental variables sampled along estuarine gradient on the subtropical system. The terms were choice on Akaike's Information Criterion (AIC) building and significance values of axes and terms from ordination were included. Significant terms of interest (α = 0.05) are highlighted in bold.

	CCA test model		
Environmental variables	*df*	AIC	p
Phosphorus (P)	1	293.08	**0.03**
Chlorophyll-a (Chl)	1	292.79	**0.02**
Silt-clay content (Silt-clay)	1	295.48	**0.01**
pH	1	296.13	**0.01**
Salinity	1	302.01	**0.01**
Calcium carbonate ($CaCO_3$)	1	291.2	0.08
PAP ratio (PAP)	1	291.32	0.11
Grain size (Grain)	1	291.77	0.14
N:P ratio (NP)	1	291.59	0.16
Redox discontinuity layer (RDL)	1	291.94	0.26
Phaeopigments (Pha)	1	292.06	0.26
Total organic carbon (TOC)	1	291.93	0.29
Nitrogen (N)	1	292.02	0.31
Organic matter (OM)	1	292.28	0.46
Temperature (Temp)	1	292.37	0.47
C:N ratio (CN)	1	292.97	0.85
Axes	*df*	Chi square	p
CCA1	1	0.8307	**0.005**
CCA2	1	0.5356	**0.005**
CCA3	1	0.2517	**0.005**
CCA4	1	0.2239	**0.005**
CCA5	1	0.0545	0.18
Residual	30	1.326	

Capítulo 2

Avaliação da estrutura das assembleias macrobênticas infaunais de um estuário subtropical usando múltiplas escalas espaciais e temporais

Assessing the structure of macrobenthic infaunal assemblages across multiple spatial and temporal scales in a subtropical estuary

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Assessing the structure of macrobenthic infaunal assemblages across multiple spatial and temporal scales in a subtropical estuary

Gisele C. Morais[1,2*] & Paulo Lana[2]

[1] Postgraduate Program in Coastal and Oceanic Systems (PGSISCO) from Universidade Federal do Paraná.

[2] Centro de Estudos do Mar, Universidade Federal do Paraná. Av. Beira-Mar, s/n, Pontal do Sul, CEP 83255-976, PO Box 61, Pontal do Paraná, Paraná, Brasil.

[*] Corresponding author:

E-mail adresses: gisellymorais@gmail.com (G.C. Morais), lana@ufpr.br (P. Lana)

[2] Tel.: +55 41 35118600; fax: +55 41 35118648

Abstract

Analyzes of spatiotemporal variability in estuarine macrobenthic assemblages are critical for identifying their responses to environmental changes. Although benthic assemblage structure has been characterized spatially and temporally in estuarine systems, only rarely complex interactions among them have been assessed over multiple scales. This study evaluates the variability patterns of macrobenthic assemblages from unvegetated tidal flats at coupled temporal and spatial scales in the subtropical Guaratuba Bay, southern Brazil. The hypothesis that large-scale variability in composition and overall abundance of intertidal macrobenthic assemblages will be always higher than small-scale variability was not refuted. In fact, three distinct assemblagesreferred to inner, intermediate and outer estuarine sectors were always recognized over time, as a response to the primary role played by salinity, pH, redox discontinuity layer and sediment texture in explaining overall distribution patterns. Overall density was always higher in the inner than in the intermediate and outer sectors. Variance associated with space (large-scale, among sectors) was always greater than variance associated with time or spatiotemporal interactions for most dominant taxa. However, variations at small-scales in number of species and the density of some numerically dominant taxa refuted our main working hypothesis. Such small-scale variability was clearly related with the quality and quantity of organic matter, as expressed by local variations in total organic carbon,

photosynthetic pigments and nutrient contents. So, the effect of distinct sets of physicochemical variables on macrobenthic distribution patterns could be discriminated simultaneously at both large and small-scales. Our approach combining space and time interactions was useful in showing how small-scale variation may further affect and regulate macrobenthic assemblages mostly structured by salinity as a major driver.

Keywords macrobenthos - intertidal flats - environmental drivers - spatiotemporal variations - estuarine system.

2.1. Introduction

Species distribution patterns result from physical and biological drivers operating simultaneously in space and time. Spatial and temporal variability along environmental gradients may be caused by intrinsic factors such as inter- and intraspecific competition and predation or extrinsic factors such as tidal effects, currents, climate change and pollution (Underwood et al. 2000; Gray and Elliott 2009), that generate complex interlinked relationships (McArthur et al. 2010).

Estuarine macrobenthic assemblages are exposed to wide fluctuations in salinity, pH, tidal influence, nutrient levels, river inflow, grain size, organic matter and oxygen at varying spatial and temporal scales (Gray and Elliott 2009). Salinity gradients are usually considered the main drivers of benthic variability (Attrill 2002; McLusky and Elliott 2004; Whitfield et al. 2012). Overall macrobenthic densities are directly or inversely related to the linear salinity gradient depending on species tolerance. In the same way, repeatable and predictable benthic assemblages may be spatially structured and clustered along the salinity gradient. Thus, distinct assemblages can be assigned to given sections of an estuarine gradient according to salinity ranges. In this sense, Whitfield et al. (2012) recognized four species groups: freshwater species more confined to the upstream region (salinity near to zero) and only a few taxa extending into other salinity areas, estuarine/brackish species capable of occupying middle regions with wide salinity range (i.e., from 5 to 30) and less diverse into other salinity areas, marine species most diverse to the downstream region (salinity >25) extending into other salinity waters in relatively small number and diadromous species that are capable of occupying waters with a salinity range from 0 to >100. However, there are still divergent and even contradictory approaches

trying to relate diversity spatial patterns to estuarine gradients worldwide (McLusky and Elliott 2004; Attrill and Rundle 2002; Whitfield et al. 2012).

Several attempts to assess benthic assemblage variation in estuaries have not used multiple small-scale replications or have underestimated short-time variations (Fonseca and Netto 2006; Rosa Filho and Aviz 2013). Such distortions can be negligible at small variation scales, but they may be relevant at large scales. As a consequence, comparisons across larger scales may be confounded if the presence or absence of small-scale variation is not described (Morrissey et al. 1992; Ysebaert and Herman 2002; Legendre et al. 2010). Interaction analysis among spatio-temporal scales without replication is less powerful than tests using adequately replicated data (Legendre et al. 2010).

In this context, the relative importance of abiotic and biotic processes clearly depends on the spatial and temporal scales considered. Therefore, better understanding the potential role played by coupled spatiotemporal variations in the macrobenthic distribution may derive from more complex designs, including hierarchical sampling at multiple spatial and temporal scales. Hierarchical sampling designs were applied to many benthic habitats in order to assess spatial and temporal variability, mainly in subtidal and intertidal sediments (Morrissey et al. 1992; Chapman et al. 2010) and rocky shores (Chapman 2002; Bulleri and Chapman 2004). However, they are less common in estuarine gradient (Ysebaert and Herman 2002; Giménez et al. 2014), including the intertidal habitats. Hierarchical sampling programs may be a powerful framework for quantifying the proportion of the variation attributable to each spatial and temporal scale (Ysebaert and Herman 2002).

In this study, we evaluate the variability patterns of macrobenthic assemblages from unvegetated tidal flats at coupled temporal and spatial scales in the subtropical Guaratuba Bay, in southern Brazil. We hypothesize that if species groups are driven by large-scale linear salinity gradients which vary from fresh to marine waters regardless of changes over time, then large-scale variability in number of species, abundance and composition among estuarine regions will be always higher than at small scales for all times. We test this hypothesis by using a hierarchical sampling design based on a complex mixed model with space (from meters to kilometers) sampled over time (among fortnights within each season), transcending routine methods of benthic sampling in estuarine ecology. Such tests will provide estimates of imprecision for the observations and coherent summaries of

repeat cases in space and/or time (Underwood et al. 2000). As such, assessments of benthic variation at multiple spatial and temporal may lead to better monitoring programs and more consistent macroecological approaches of estuarine systems.

2.2. Methods

2.2.1 Study area

Guaratuba Bay is a subtropical estuarine system (25º52'38.03''S and 48º38'17.82''W, Fig. 1), ranked as one of the most pristine estuaries from southern Brazil and as such categorized as an Environmental Protection Area. Guaratuba Bay extends for nearly 15 km long and 5 km wide (Bigarella 2001), with a surface area of 50.19 km² (Marone et al. 2006). The bay is surrounded by mangrove forests and salt marshes that remain untouched mainly along its northern margin, besides extensive stretches of the Atlantic Rain forest.

The climate is classified as humid subtropical (Köppen climate classification Cfa), characterized by warm wet summers (temperatures from 22 ºC to 25 ºC in November-April) and cold dry winters (temperatures from 14 ºC to 18 ºC in May-October (SEMA/IAP 2008). The climate is strongly influenced by the semi-permanent anti-cyclone in the South Atlantic and passage of polar fronts during the winter (Lana et al. 2001). Annual rainfall average is 2500 mm and mean air humidity around 85% (SEMA/IAP 2008).

The main regional rivers, Cubatão and São João, draining the Serra do Mar ("Mar mountain range"), have a combined average annual discharge of about 80 $m^3 s^{-1}$ into the Guaratuba Bay (Marone et al. 2006). They flow through urbanized, agriculture (mainly rice and banana), livestock and farming areas, and effluent contaminants (such as pesticides, phosphorus, mercury) are discharged downstream in the estuarine system (Sanders et al. 2008; Combi et al. 2013; Cotovicz Junior et al. 2014).

Guaratuba Bay is a microtidal estuary with strong currents (up to 2.3 m s^{-1}) and an estimated residence time of 9.3 days (Marone et al. 2006). Tides are semidiurnal with diurnal inequalities and may reach up to 2 m at the mouth of the bay during spring tides (Marone et al. 2006). Estuary has vertical and horizontal salinity stratification of their water masses (Marone et al. 2006; Brandini 2008). Three estuarine sectors can be recognized: upper dominated by riverine processes

(salinities ranging from 0 to 10), middle with oscillating mixing zones (salinities about 10 to 25) and lower with salinities ranging from 23 to 34 (Brandini 2008; Mizerkowski et al. 2012).

The greatest recorded depth at the entrance channel of Guaratuba Bay is 27 m, but about 30% of area are less than 5 m deep (Krug and Noernberg 2005; Marone et al. 2006). The estuarine system is bounded by extensive shallow tidal flats (sometimes <1m during flood tide), which are exposed during low tides, and composed mainly of poorly sorted fine sand and silt (Cotovicz Junior et al. 2014).

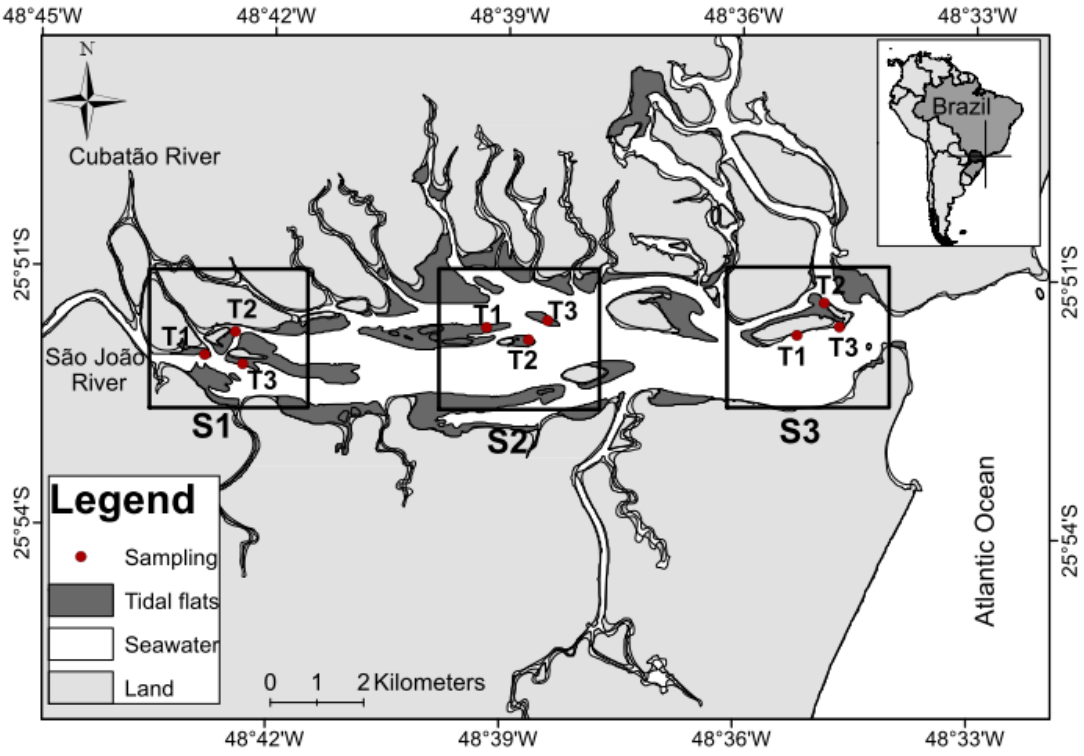


Fig. 1 Map of Guaratuba Bay displaying the location of the three sampled tidal flats (T1 to T3) at each estuarine sector. Sectors: S1 = inner, upper or upstream; S2 = middle or intermediate; S3 = outer, lower or downstream.

2.2.2 Sampling design and data collection

Sampling was conducted at intertidal habitats along the main estuarine axis to assess the variability of macrobenthic assemblages. Tidal flats were carefully selected across the estuarine gradient to avoid the putative effects of freshwater discharge from rivers and tidal creeks. Three sectors were spatially distanced in the scale of kilometers (10^3 m) along the estuarine gradient: inner or oligohaline (S1), intermediate or mesohaline to polyhaline (S2) and outer or polyhaline to euryhaline

(S3). Three Tidal flats, distanced in the scale of hundreds of meters (10^2 m), were randomly selected in each sector. Three Locations (2 m x 2 m quadrats) distanced in the scale of tens of meters (10^1 m) and positioned parallel to the water line at similar tidal levels were stablished within each tidal flat. For each location, three benthic samples were collected during low spring tides using plastic core tubes (15 cm in diameter to 10 cm depth) within sampling plots of 50 cm x 50 cm randomly spaced in the scale of meters (10^0 m). Nested spatial design was carried out on each three consecutive fortnights during rainy (March and April 2012) and dry (October and November 2012) seasons (Fig. 2). Samples were collected during 3-4 consecutive days at each sampling occasion.

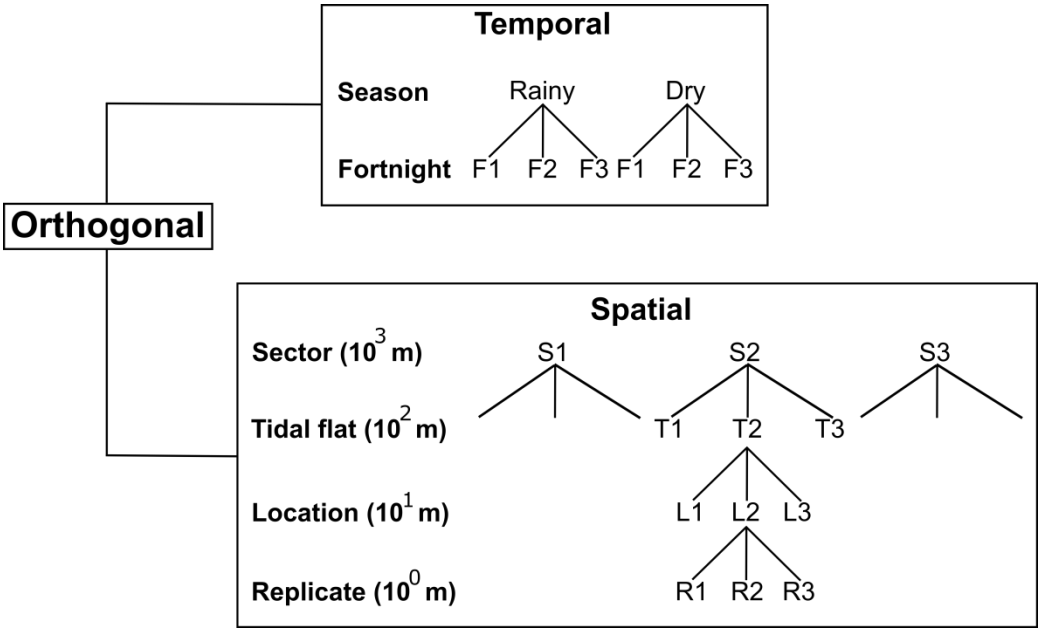


Fig. 2 Diagram of the sampling design with scales of temporal and spatial variability corresponding to the factors of the linear model: Season (Rainy and Dry), Fortnight (F1, F2 and F3), Sector (S1, S2 and S3), Tidal flat (T1, T2 and T3), Location (L1, L2 and L3), with three replicates each.

Salinity and pH were measured in situ at each location with a portable refractometer and water pH meter. Surface sediment temperature was taken with a digital thermometer inserted to a 10 cm depth. Three measures of the apparent redox discontinuity layer (RDL), used as a proxy for redox conditions of the sediment, were taken at each location with a ruler. We considered the limit depth of the RDL as the boundary or transition from light color sediment (oxygen-rich) to a darker layer, grey or black (oxygen-poor) (Bianchi 2007).

Additional sediment samples were taken at each location with a plastic core tubes (5 cm in diameter buried to 10 cm depth) to determine grain size, organic matter (OM) and calcium carbonate ($CaCO_3$) contents. One replicate with ~10 g of surface sediment (top 1 cm) was taken for nutrient analysis (total nitrogen, phosphorus and organic carbon). Another surface sediment replicate (~2 g in the top 1 cm) was taken to estimate photosynthetic pigments content (Chorophyll-a and Pheopigments). All sediment samples for biogeochemical analyzes were taken to the laboratory under refrigerated and dark conditions, kept at -20^{o}C, then dried and macerated, except in the case of photosynthetic pigments, for further processing.

All faunal samples were preserved in 4% formaldehyde and sieved through a 0.5 mm mesh screen. The retained material was stored in 70% ethanol – rose Bengal solution until sorting. Subsampling and flotation with a sugar solution (>1.2 g/ml) was necessary for the samples from the inner sector due to the high amount of detritus. Animals were identified to species or morphotype levels and counted.

Laboratory procedures for granulometry, calcium carbonate, organic matter, nutrients contents (organic carbon - COT, nitrogen - N and phosphorus - P) and photosynthetic pigments (Chlorophyll-a: Chl and Phaeopigments: Pha) analysis followed the same techniques and routines described in Chapter 1. The molar N:P and C:N ratios were used to assess the nutrient limitation and relative contribution of autochthonous and allochthonous inputs of organic matter along the estuarine gradient. Organic matter quality was determined by the ratio of phaeopigments to the sum of chlorophyll-a and phaeopigments (PAP ratio). It was calculated as an indication of the freshness or degradation conditions of the material deposited in the sediment (Boon et al. 1998).

2.2.3 Data processing

Taxa composition, number of species (measured as number of taxa, including unidentified species), total abundance and abundance of the species with the highest contributions to overall assemblage variation were used to assess estuarine assemblage structure. Physicochemical variables included temperature, RDL, salinity, pH, chlorophyll-a, phaeopigments, TOC, OM, nitrogen, phosphorus, $CaCO_3$, mean grain size, molar N:P ratio, molar C:N ratio and PAP ratio.

Spatial and temporal variations in number of species and abundance were evaluated using analyses of variance (ANOVAs). The mixed linear model used in

univariate analysis consisted of three nested spatial factors orthogonal at two nested temporal factors: Sector (fixed; three levels; inner, intermediate and outer), Tidal flats (random, three levels; nested in Sectors), Location (random; three levels; nested in Tidal flats with 3 replicates); and Season (fixed; two levels; rainy and dry), Fortnight (random; three levels; nested in Seasons). A simplified mixed model was also applied to assess the differences in the physicochemical variables with univariate analysis considering two spatial factors orthogonal at two temporal factors: Sector (fixed; three levels; inner, intermediate and outer), Tidal flats (random, three levels; nested in Sectors with 3 replicates); and Season (fixed; two levels; rainy and dry), Fortnight (random; three levels; nested in Seasons). We used a quasi F-ratio (Quinn and Keough 2002) for tested terms without an appropriated F-ratio in the ANOVA: Season, Sector, Tidal flat within Sector, interactions (Season x Sector) and (Season x Tidal flat within Sector). Means were compared using Student-Newman-Keuls test (SNK) in the case of terms significant at $p<0.05$.

Homogeneity of variances was verified using Cochran's test at the 0.05 significance level. In the case of violation of assumptions, we transformed the data to decrease the asymmetry of variance heterogeneity. However, we ran the tests even when transformations did not meet the assumptions, because ANOVA tests are still robust when the design is balanced and with appropriate replication (Underwood 1997). Besides, a variance component analysis (VC%) was used to estimate the amount of variation for each source of spatial and temporal variability or interactions between them. The significance of a factor (presented in the form of probability-values) describes how likely the patterns explained by the factor are simply due to random chance and thus serve no functional importance to the researcher (Graham and Edwards 2001). Additionally, significance (*p* values) is inherently dependent on the amount of sample while determination of fit (measured as VC%) is an estimate of the variance in a response variable that can be explained by the factor. Therefore, the approach adopted here considers proportion of total variance as the best estimate of the contribution of a given factor to variability in a response variable (as suggested by Graham and Edwards 2001).

Differences among macrobenthic assemblages caused by variations in taxa composition or abundance at multiple spatial and temporal scales were tested by a permutational multivariate analysis using PERMANOVA (Anderson et al., 2008). We used the same factors from the ANOVA, with three spatial and two temporal scales.

The test was performed under 9999 permutations with a level of significance at $p < 0.05$, provided by a Monte Carlo asymptotic p-value. Variance components (VC%) were also estimated for each source of spatiotemporal variation of the PERMANOVA. This test was followed by a posteriori pair-wise comparisons on terms significant at $p < 0.05$.

A non-metric multidimensional scaling (nMDS) ordination was used to visualize main variation trends of macrobenthic assemblages among and within sectors for pooled data and separately for rainy and dry. Similarity percentages (SIMPER) analysis was applied to identify the contribution of typically abundant macrobenthic taxa to the total dissimilarity in assemblages among sectors and sampling periods at the cutoff level of 50%. These multivariate analyzes were performed using Bray-Curtis similarity coefficients adding a “dummy species value” of 1 (Clarke et al. 2006) on fourth root transformed abundance data.

All statistical analyses and graphs, except the PERMANOVA (Anderson et al., 2008), were carried out using R environment for statistical computing (R Development Core Team 2015), with the packages “GAD” (Sandrini-Neto and Camargo, 2010), “sciplot” (Morales, 2012) and “vegan” (Oksanen et al., 2013).

2.3. Results

2.3.1 Spatiotemporal changes in physicochemical variables

There were significant interactions between space and time for all variables, but the relative importance (% VC) of individual factors and interactions varied among them (Table 1, Fig. 3). There were progressive temporal trends for temperature among Fortnights at each Season (SNK, $p<0.001$, Fig. 3). Temporal scales accounted for most of total variation, although temperature did differ among Tidal flats and Sectors interacting with Fortnights (Table 1). Although significant interactions at small scales were detected for salinity, pH, redox discontinuity layer and grain size (Table 1), the largest spatial scale (Sectors) accounted for most of the overall variation. Salinity and pH were significantly lower in the inner sector and increased towards the outer sector; however, most of the time salinity did not vary significantly between the intermediate and outer sectors (SNK, $p<0.01$, Fig. 3). The redox discontinuity layer was significantly larger and more irregular in the inner than other sectors; no significant differences were found between the intermediate and outer sectors. This pattern was consistent across time (SNK, $p<0.001$, Fig. 3). Grain

size differed significantly among sectors over time (SNK, $p<0.01$, Fig. 3): the inner sector was characterized by fine to medium sand, while the intermediate sector varied from silt to very fine sand and the outer sector by very fine to fine sand.

The largest proportion of total variance on interaction between Season and Sector was observed for chlorophyll-a, total organic carbon, nitrogen and N:P ratio, although there were significantly differences among Tidal flats over sampling periods (Table 1). In general, amounts of chlorophyll-a were significantly greater in the intermediate than in the other sectors during the rainy season; however, there were no significant differences among sectors in the dry season (SNK, $p<0.05$, Fig. 3). In dry season, nitrogen content was significantly higher in the inner than in the other sectors, but there were significant differences among Tidal flats at Fortnights for both seasons (SNK, $p<0.001$, Fig. 3). N:P ratio was significantly lower in rainy season and did not differ among sectors, but was significantly greater in the inner sector during the dry season (SNK, $p<0.05$, Fig. 3). Similarly, total organic carbon differed significantly among sectors for each season (Table 1). The concentration of carbon was always greater in the intermediate and inner sectors during rainy and dry seasons, respectively (SNK, $p<0.05$, Fig. 3).

Variations of phosphorus, phaeopigments, PAP ratio, calcium carbonate and organic matter contents were significant for the interactions between sectors and times (Table 1). These interactions and the corresponding residuals (except for phosphorus that varied among fortnights) accounted for a high percentage of the overall variance. Phaeopigments and PAP ratio differed among sectors, but patterns were not consistent across fortnights (Table 1). Then, phosphorus, phaeopigment contents, and PAP were higher in the inner, intermediate or outer sectors (SNK, $p<0.01$, Fig. 3), depending on the sampling time. Calcium carbonate and organic matter contents were significantly higher in the intermediate sector during the rainy season, but no significant differences were found between the inner and outer sectors over time (SNK, $p<0.001$, Fig. 3). There were significant differences in C:N ratio among tidal flats at the fortnight scale, but no significant differences among sectors (Table 1).

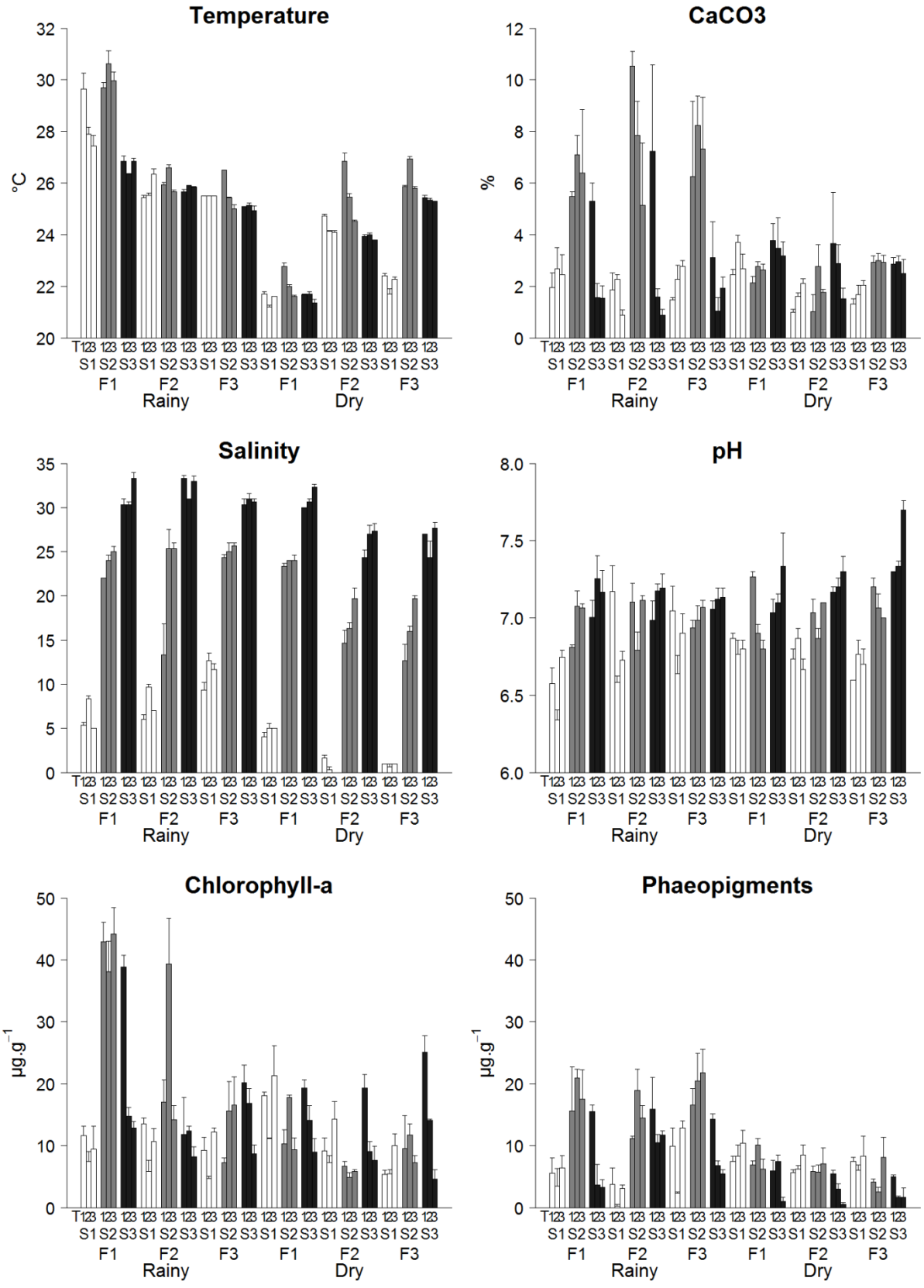
Table 1 Summary of the analyses of variance ANOVA (MS = mean square, F values and significant level) performed for each physicochemical variable sampled on the subtropical estuarine system. We considered the spatial factors (Sector and Tidal flats nested in Sector) orthogonal to temporal factors (Season and Fortnights nested in Season). VC% = variance component as percentages of the total. *df* = degrees of freedom, n = 3. Significant differences are shown with ***p <0.001; **p <0.01; *p <0.05; ns=not significant.

		Temperature			**RDL**			**Salinity**			**pH**		
Source	*df*	MS	*F*	VC%	MS	*F*	VC%	MS	*F*	VC%	MS	*F*	VC%
Season = Se	1	343.22	4.84	29.25	15.3	1.88	2.98	11.573	6.36	13.04	0.160	0.88	0
Sector = S	2	30.64	2.87	9.81	1662.98	27.51***	46.54	53.126	70.11***	36.89	2.728	12.13**	29.22
Fortnight (Se) = F (Se)	4	70.82	88.33***	25.66	7.89	1.35	2.34	1.678	19.45***	9.09	0.071	1.74	4.52
Tidal flats (S) = T(S)	6	1.79	2.23	3.73	56.01	9.55***	14.24	0.143	1.66	2.11	0.132	3.23*	9.59
Se x S	2	10.07	1.16	3.71	42.71	6.04**	10.45	5.638	7.43**	16.03	0.085	0.49	0
F(Se) x S	8	9.18	11.45***	15.37	4.65	0.79	0	0.615	7.14***	9.08	0.096	2.35	10.56
Se x T(S)	6	0.24	0.29	0	3.39	0.58	0	0.155	1.80	3.27	0.158	3.87**	15.38
F(Se) x T(S)	24	0.8	9.23***	7.78	5.86	1.13	4.01	0.086	5.27***	5.71	0.041	1.83*	10.58
Residuals	108	0.09		4.70	5.2		19.45	0.016		4.79	0.022		20.15
Transformation		no			no			ln(x+1)			no		
Cochran's C test		***			***			***			ns		

		CaCO3			**Chlorophyll-*a***			**Phaeopigments**			**PAP ratio**		
Source	*df*	MS	*F*	VC%	MS	*F*	VC%	MS	*F*	VC%	MS	*F*	VC%
Season = Se	1	0.284	2.08	6.59	17.152	2.05	8.98	21.7037	6.34*	12.23	0.049	0.34	0
Sector = S	2	0.774	5.11*	16.02	9.015	0.94	0	16.4521	2.53	11.08	0.295	1.91	9.95
Fortnight (Se) = F (Se)	4	0.088	2.68	6.59	8.370	8.51***	13.86	1.9251	4.57**	6.02	0.140	9.46***	12.99
Tidal flats (S) = T(S)	6	0.127	3.89**	10.58	6.884	7.00***	15.17	4.8877	11.60***	12.70	0.020	1.34	3.18
Se x S	2	0.825	8.98**	24.56	17.509	4.42*	19.29	22.6446	6.88**	21.78	0.314	1.71	13.54
F(Se) x S	8	0.031	0.95	0	3.717	3.78**	14.61	1.7878	4.24**	9.93	0.143	9.61***	22.69
Se x T(S)	6	0.065	1.98	8.70	0.469	0.48	0	1.5657	3.71**	9.09	0.050	3.38	11.93
F(Se) x T(S)	24	0.033	0.96	0	0.983	2.67***	11.99	0.4215	0.93	0	0.015	1.06	3.19
Residuals	108	0.034		26.95	0.369		16.10	0.454		17.18	0.014		22.53

Transformation		sqrt(sqrt(x))			sqrt(x)			sqrt(x)			no	
Cochran's C test		**			ns			ns			**	
		TOC			**Organic matter**			**Nitrogen**			**Phophorus**	
Source	*df*	MS	*F*	VC%	MS	*F*	VC%	MS	*F*	VC%	MS	*F*	VC%
Season = Se	1	0.738	0.15	0	1.642	3.47	7.24	1.969	1.90	4.50	7.505	0.86	0
Sector = S	2	18.884	2.02	8.86	9.157	9.76**	22.39	8.316	4.00*	13.72	6.691	1.24	6.73
Fortnight (Se) = F (Se)	4	6.147	5.17**	8.76	0.187	0.88	0	0.484	2.31	4.02	8.840	10.98***	22.31
Tidal flats (S) = T(S)	6	7.674	6.45***	12.27	0.724	3.42*	9.57	0.406	1.94	4.16	2.076	2.58*	10.87
Se x S	2	45.031	5.14*	24.00	4.390	7.90**	21.89	16.487	7.00**	29.02	3.506	0.91	0
F(Se) x S	8	2.254	1.90	7.03	0.236	1.11	2.91	1.725	8.23***	16.36	3.957	4.92**	24.21
Se x T(S)	6	6.746	5.67***	16.06	0.347	1.64	6.94	0.661	3.15*	8.92	0.805	1.00	0.22
F(Se) x T(S)	24	1.189	3.29***	10.74	0.212	1.07	3.78	0.210	2.86***	8.50	0.805	4.76***	18.83
Residuals	108	0.361		12.29	0.199		25.29	0.073		10.80	0.169		16.82
Transformation		sqrt(x)			ln(x+1)			sqrt(x)			no	
Cochran's C test		*			*			**			*	

		N:P ratio			**C:N ratio**			**Grain**		
Source	*df*	MS	*F*	VC%	MS	*F*	VC%	MS	*F*	VC%
Season = Se	1	1.245	1.07	1.64	0.017	0.11	0	0.496	2.21	5.20
Sector = S	2	6.155	3.76	14.31	15.928	2.94	11.37	11.490	16.98***	34.29
Fortnight (Se) = F (Se)	4	1.087	6.05**	8.94	20.010	7.87***	19.25	0.144	0.73	0
Tidal flats (S) = T(S)	6	0.253	1.41	3.12	2.534	1.00	0	0.510	2.59*	10.03
Se x S	2	9.975	6.06*	27.33	10.345	1.77	10.89	0.937	3.26	12.96
F(Se) x S	8	1.430	7.96***	18.17	3.747	1.47	8.75	0.179	0.91	0
Se x T(S)	6	0.246	1.37	4.17	3.552	1.40	8.01	0.170	0.86	0
F(Se) x T(S)	24	0.180	2.50***	9.25	2.544	2.29**	16.56	0.196	2.02**	13.81
Residuals	108	0.072		13.07	1.107		25.18	0.097		23.72
Transformation		ln(x+1)			ln(x+1)			ln(x+1)		
Cochran's C test		**			***			*		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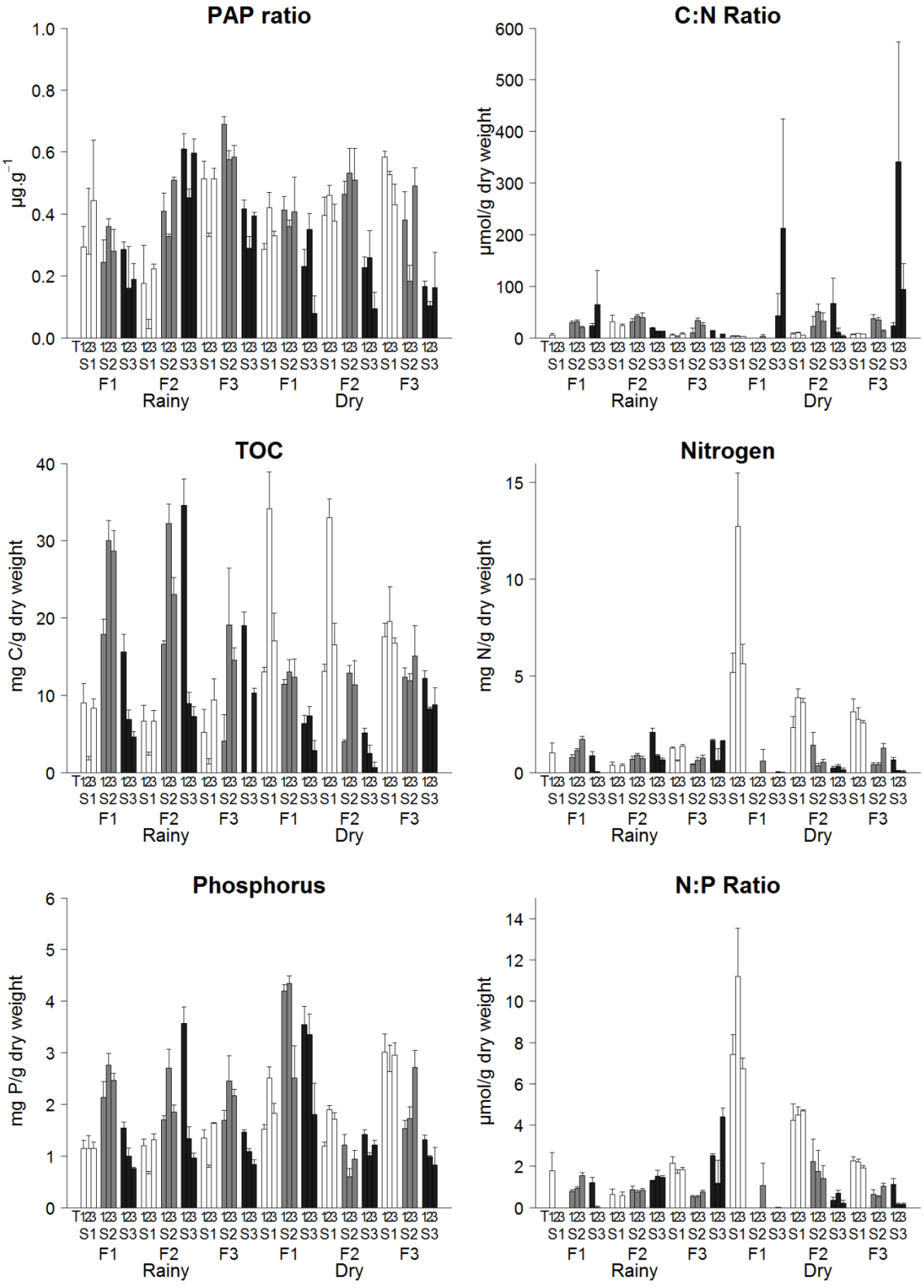
°C
CaCO3
%
Salinity
pH
Chlorophyll-a
Phaeopigments
µg.g⁻¹
T 1 2 3
S1 S2 S3
F1 F2 F3
Rainy
Dry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µg.g-1
C:N Ratio
µmol/g dry weight
TOC
mg C/g dry weight
Nitrogen
mg N/g dry weight
Phosphorus
mg P/g dry weight
N:P Ratio
µmol/g dry weight
T123 123 123 123 123 123 123 123 123 123 123 123 123 123 123 123 123 123
S1 S2 S3 S1 S2 S3 S1 S2 S3 S1 S2 S3 S1 S2 S3 S1 S2 S3
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Rainy
Dry

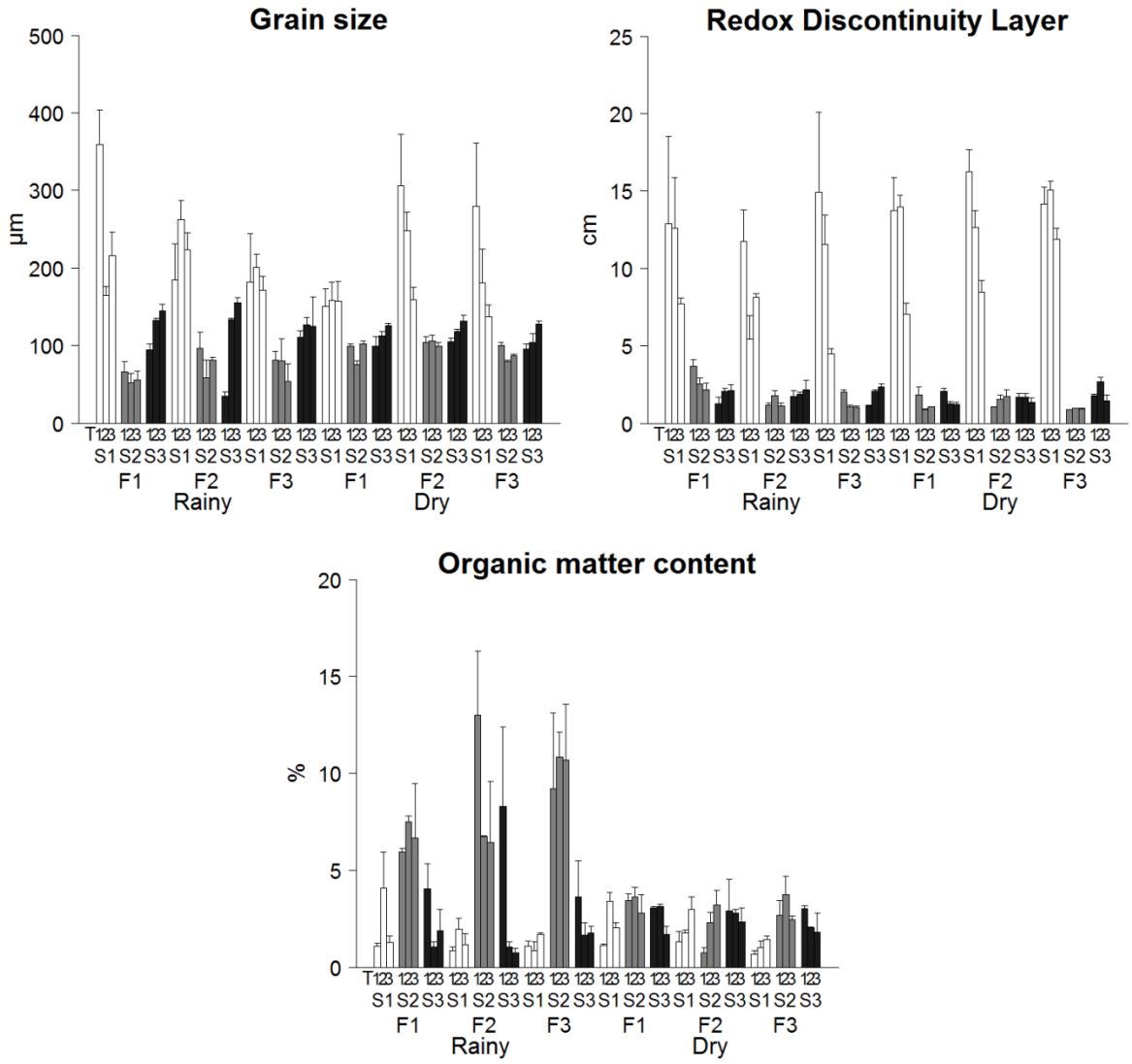


Fig. 3 Mean values (±SE) for each physicochemical variable sampled on the subtropical system. Sectors were represented by colors (*white:* S1-upstream, *grey*: S2-intermediate and *black*: S3-downstream) which included different tidal flats for each sector (T1, T2 and T3). Sampling was performed in three fortnights during rainy and dry seasons.

2.3.2 Spatiotemporal changes in macrobenthic assemblage structure

The survey yielded 114 macrobenthic taxa in total (Appendix 1). Number of species and abundance had different spatial and temporal patterns of significance. There were significant interactions between space and time for all biological attributes (Table 2, Fig. 4) but the relative importance (% VC) of individual factors and interactions was highly variable.

Number of species varied significantly at the scale of Tidal flats and Locations interacting with Fortnights. A large amount of variation was concentrated at both residuals and interaction between Tidal flats and Fortnights (Table 2, Fig. 4),

indicating a high spatial variability at smaller spatial scales in a short time. Total abundance, in contrast, varied significantly at all spatial scales (from tens of meters to kilometers) interacting with Fortnights (Table 2, Fig. 4). Still the largest spatial scale (sectors) most contributed to the overall variance. Overall benthic abundance was significantly higher in the inner sector, but did not differ between the intermediate and outer sectors (SNK, $p<0.001$, Fig. 4). These variation patterns were consistent over time.

Significant interactions between space and time were detected for the amphipod *Monochorophium acherusicum*, an unidentified ostracod species, the bivalve *Mytella guyanensis* and the polychaetes *Nephtys fluviatilis* and *Aricidea* spp. (Table 2). However, the largest spatial scale (sectors) still accounted for most of the overall variation. *M. acherusicum*, an unidentified ostracod species, *M. guayanensis* and *N. fluviatilis* were consistently more abundant in the inner sector, while *Aricidea* spp. was more abundant in the outer sector (SNK, $p<0.001$, Fig. 4). Similarly, significant interactions between space and time were recorded for the unidentified oligochaete species and the polychaetes *Heteromastus* cf. *similis* and *Streblospio* cf. *benedicti* (Table 2) Residuals almost always accounted for most of the total variability, indicating that organisms were patchily distributed, but Sector were also relevant. A high contribution of the interaction between Season and Sector for overall variation was observed only for the polychaete *Laeonereis pandoensis* (Table 2). Abundances of *L. pandoensis* were alternatively higher in the intermediate and inner sectors during rainy and dry seasons, respectively (SNK, $p<0.001$, Fig. 4). There was also a temporal pattern in the abundance of the gastropod *Heleobia australis*. The most contrasting result is that, for this gastropod, largest temporal (Season) and spatial (Sectors) scales accounted for most of the overall variation. *H. australis* was more abundant in dry season and less abundant in the outer sector (SNK, $p<0.001$, Fig. 4).

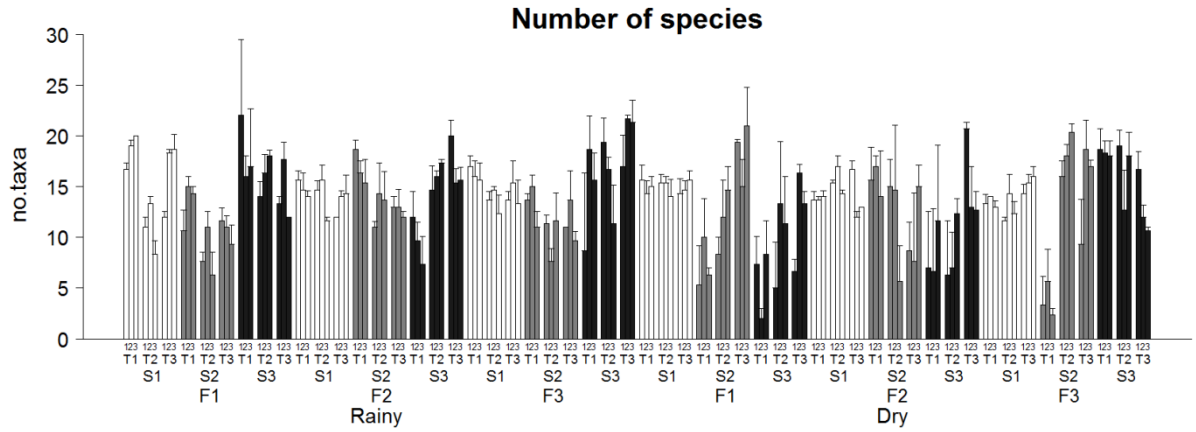
Table 2 Summary of the analyses of variance ANOVA (MS = mean square, *F* values and significant level) performed for taxa richness, total abundance and some individual taxa abundance from macroinfauna sampled on the subtropical estuarine system. We considered the spatial factors (Sector, Tidal flats nested in Sector and Location nested in Tidal flats and Sector) orthogonal to temporal factors (Season and Fortnights nested in Season). VC% = variance component as percentages of the total. *df* = degrees of freedom, n = 3. Significant differences are shown with ***p <01; **p <0.01; *p <0.05; ns=not significant.

		Richness			Total Abundance			*Monocorophium acherusicum*			Ostracoda		
Source	*df*	MS	*F*	VC%	MS	*F*	VC%	MS	*F*	VC%	MS	*F*	VC%
Season = Se	1	206.767	1.88	6.13	3048	2.38	6.00	601	0.66	0	0.02	0.33	0
Sector = S	2	228.274	2.26	8.50	54395	41.77***	38.36	40901	39.47***	39.49	362.19	59.06***	37.04
Fortnight (Se) = F (Se)	4	33.058	0.37	0	661	1.99	4.25	874	1.92	5.70	1.28	0.96	0
Tidal flats (S) = T(S)	6	47.582	0.67	0	285	0.86	0	202	0.47	0	4.87	2.86*	6.40
Se x S	2	161.298	1.15	5.16	171	0.28	0	612	0.68	0	53.48	13.36**	19.73
Location (T(S)) = L(T(S))	18	15.08	0.66	0	52	1.17	1.38	37	1.16	1.35	0.58	0.96	0
F(Se) x S	8	93.295	1.04	2.97	1025	3.09*	10.70	846	1.86	9.53	1.29	0.96	0
Se x T(S)	6	125.047	1.40	10.13	761	2.00	8.16	725	1.42	7.21	2.82	1.72	5.73
Se x L(T(S))	18	16.405	0.71	0	71	1.59	3.60	78	2.48**	5.70	0.66	1.09	1.96
F(Se) x T(S)	24	89.691	3.89***	22.12	332	7.47***	11.94	455	14.39***	17.17	1.34	2.22***	7.12
F(Se) x L(T(S))	72	22.999	1.35*	11.49	44	2.11***	5.90	32	4.39***	7.14	0.6	1.69***	7.12
Residuals	324	16.998		33.50	21		9.71	7		6.72	0.36		14.90
Transformation		no			sqrt(x)			sqrt(x)			sqrt(sqrt(x))		
Cochran's C test		**			ns			***			***		

		Oligochaeta			*Laeonereis pandoensis*			*Nephtys fluviatilis*			*Aricidea* spp.		
Source	*df*	MS	*F*	VC%	MS	*F*	VC%	MS	*F*	VC%	MS	*F*	VC%
Season = Se	1	40.244	3.01	6.79	35.063	14.61**	10.05	6330.3	15.79**	14.92	2.52	0.39	0
Sector = S	2	136.51	5.44*	15.85	84.146	24.02***	19.21	16237.1	38.10***	29.50	440.03	14.99**	33.72
Fortnight (Se) = F (Se)	4	10.973	1.28	3.19	1.606	1.93	2.65	292.5	1.24	2.47	5.59	2.94*	4.51
Tidal flats (S) = T(S)	6	19.972	1.89	8.24	1.62	1.66	3.32	261.8	1.02	1.04	23.8	8.23***	13.29
Se x S	2	47.48	4.69*	13.68	110.892	40.36***	31.43	1271.9	5.13*	11.48	12.6	1.27	4.14
Location (T(S)) = L(T(S))	18	3.368	1.27	3.71	0.404	0.95	0	68.5	1.38	3.04	1.05	2.10*	3.70

F(Se) x S	8	6.699	0.78	0	1.918	2.31	5.44	170.6	0.72	0	5.69	2.99*	7.91
Se x T(S)	6	5.263	0.71	0	0.85	1.15	2.16	123.4	0.65	0	5.7	2.64*	7.99
Se x L(T(S))	18	2.64	1.00	0	0.274	0.64	0	30.5	0.61	0	0.44	0.89	0
F(Se) x T(S)	24	8.576	3.24***	15.05	0.832	1.95*	5.75	236.2	4.76***	13.50	1.9	3.81***	8.34
F(Se) x L(T(S))	72	2.647	2.07***	12.53	0.427	1.80***	6.81	49.6	1.24	5.29	0.5	1.05	1.80
Residuals	324	1.277		20.95	0.237		13.20	40.1		18.77	0.48		14.61
Transformation		ln(x+1)			sqrt(sqrt(x))			no			ln(x+1)		
Cochran's C test		ns			***			***			***		

		Heteromastus cf. *similis*			*Streblospio* cf. *benedicti*			*Heleobia australis*			*Mytella guayanensis*		
Source	*df*	MS	*F*	VC%	MS	*F*	VC%	MS	*F*	VC%	MS	*F*	VC%
Season = Se	1	9.536	5.15*	8.55	7.705	1.31	3.62	138.158	11.91**	19.14	20.536	2.40	5.26
Sector = S	2	40.296	12.07**	21.82	40.056	4.27	17.73	77.316	20.43***	17.95	122.446	13.39***	19.28
Fortnight (Se) = F (Se)	4	0.768	0.56	0	3.275	5.74**	7.39	5.943	3.69*	6.10	3.648	2.67	3.85
Tidal flats (S) = T(S)	6	3.142	1.86	7.91	8.456	8.10***	15.32	2.536	1.52	3.68	2.559	1.35	2.77
Se x S	2	1.321	1.63	5.09	2.565	0.76	0	19.787	3.00	11.07	53.555	4.52*	16.66
Location (T(S)) = L(T(S))	18	0.554	1.19	3.14	0.519	1.40	3.66	0.426	0.77	0	0.898	1.81*	3.43
F(Se) x S	8	0.31	0.22	0	1.059	1.86	5.44	1.327	0.82	0	6.685	4.89**	10.18
Se x T(S)	6	1.352	0.95	0	3.053	3.74**	12.33	5.796	3.07*	10.49	5.471	2.62*	8.48
Se x L(T(S))	18	0.531	1.14	3.82	0.346	0.93	0	0.458	0.83	0	0.907	1.83*	4.91
F(Se) x T(S)	24	1.381	2.97***	14.33	0.57	1.53	6.01	1.61	2.93***	9.05	1.366	2.76***	7.13
F(Se) x L(T(S))	72	0.466	1.43*	9.69	0.372	1.34*	7.19	0.55	1.44*	6.23	0.495	1.95***	6.51
Residuals	324	0.326		25.66	0.277		21.29	0.383		16.31	0.253		11.54
Transformation		sqrt(sqrt(x))			sqrt(sqrt(x))			sqrt(sqrt(x))			sqrt(sqrt(x))		
Cochran's C test		ns			**			**			ns		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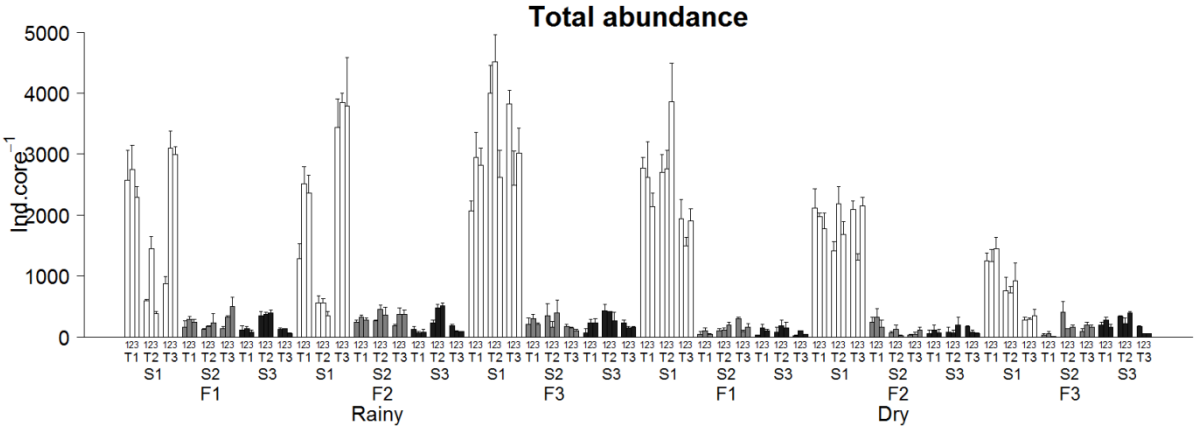
10
15
20
25
30
123 T1 T2 T3
S1 S2 S3
F1 F2 F3
Rainy
Dry


Total abundance
Ind.core⁻¹
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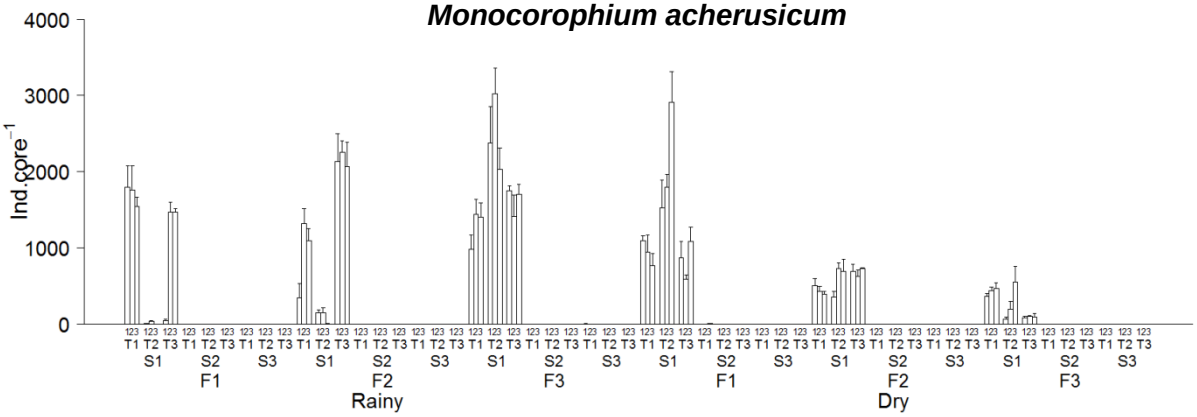
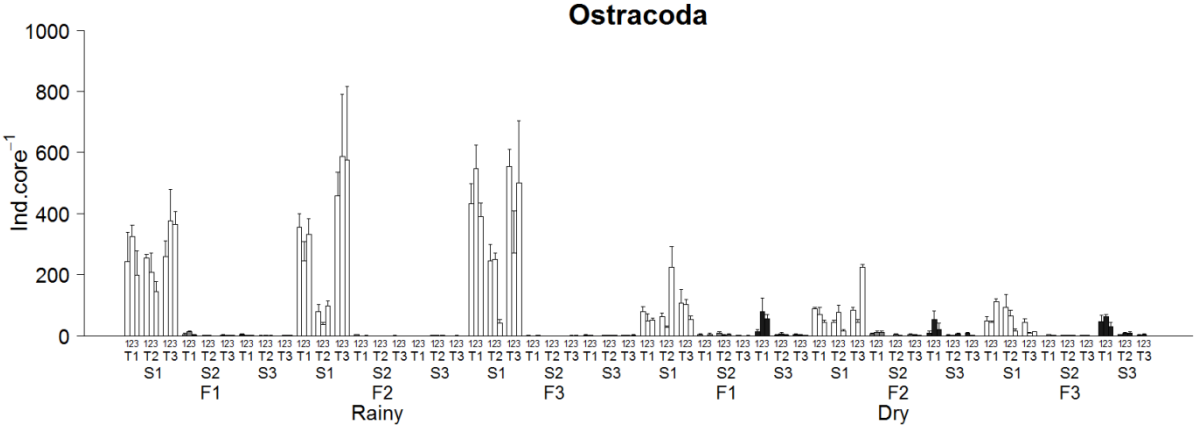
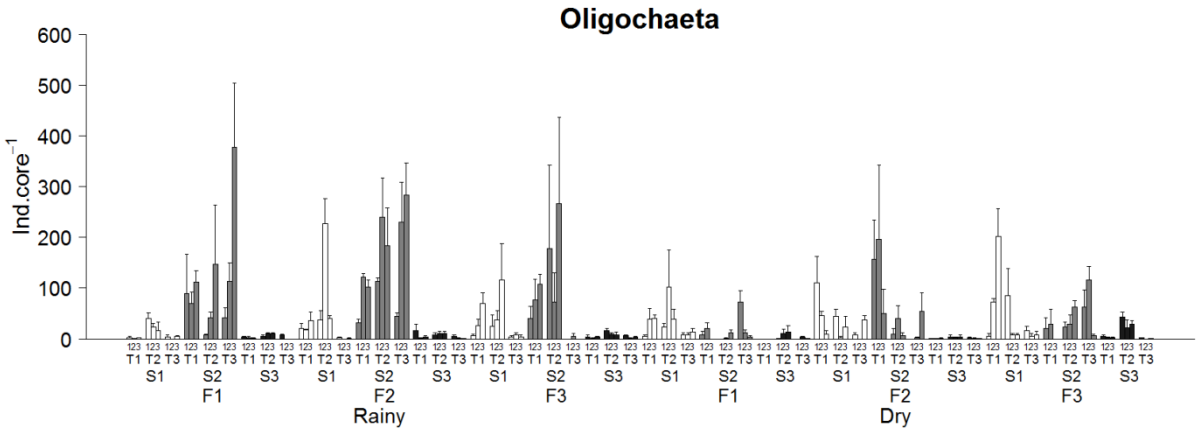
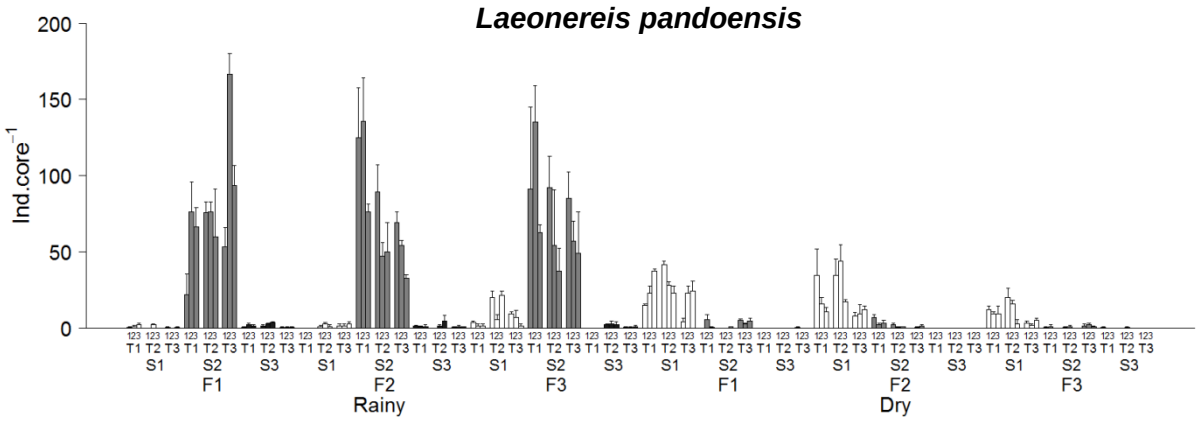
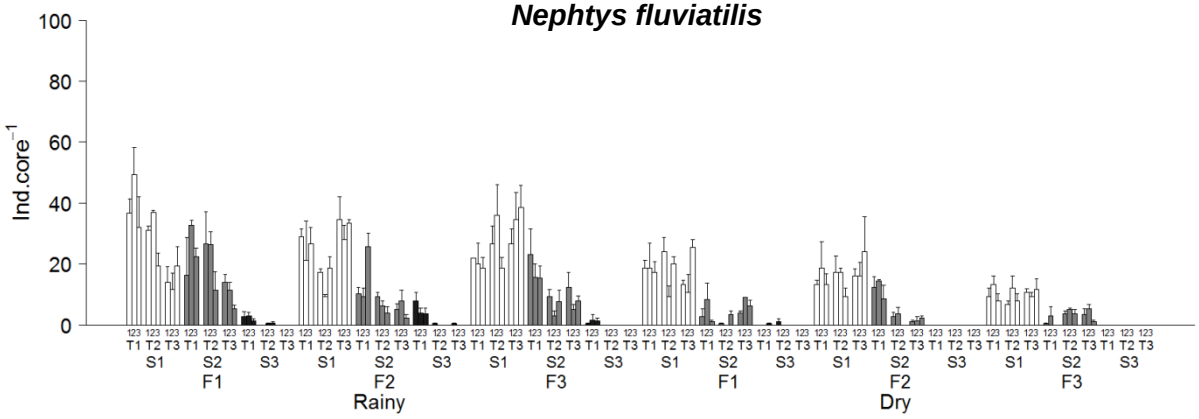
1000
2000
3000
4000
5000
123 T1 T2 T3
S1 S2 S3
F1 F2 F3
Rainy
Dry

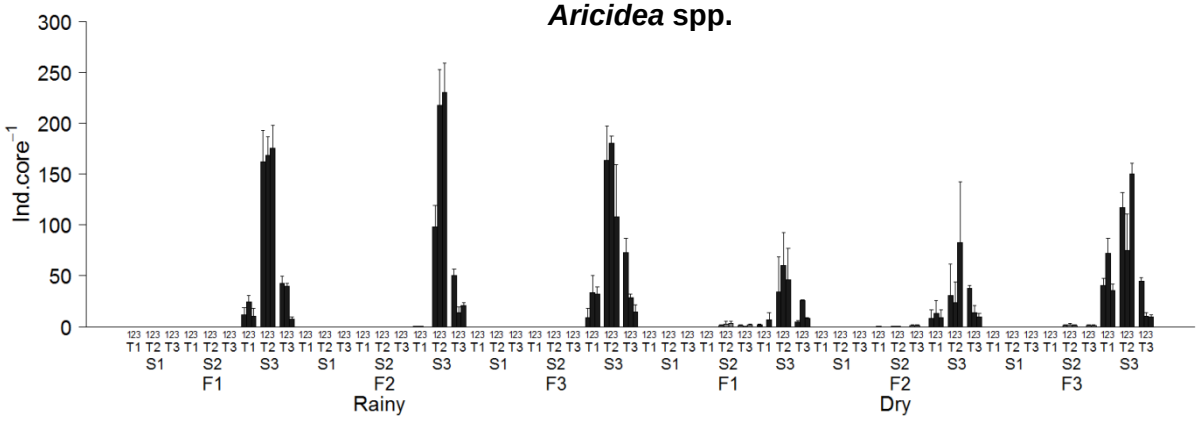

Monocorophium acherusicum
Ind.core⁻¹
0
1000
2000
3000
4000
123 T1 T2 T3
S1 S2 S3
F1 F2 F3
Rainy
Dry


Ostracoda
Ind.core⁻¹
0
200
400
600
800
1000
123 T1 T2 T3
S1 S2 S3
F1 F2 F3
Rainy
Dry


Oligochaeta
Ind.core⁻¹
0
100
200
300
400
500
600
T1 T2 T3
S1 S2 S3
F1 F2 F3
Rainy
Dry


Laeonereis pandoensis
Ind.core⁻¹
0
50
100
150
200
T1 T2 T3
S1 S2 S3
F1 F2 F3
Rainy
Dry


Nephtys fluviatilis
Ind.core⁻¹
0
20
40
60
80
100
T1 T2 T3
S1 S2 S3
F1 F2 F3
Rainy
Dry


Aricidea spp.
Ind.core⁻¹
0
50
100
150
200
250
300
T1 T2 T3
S1 S2 S3
F1 F2 F3
Rainy
Dry

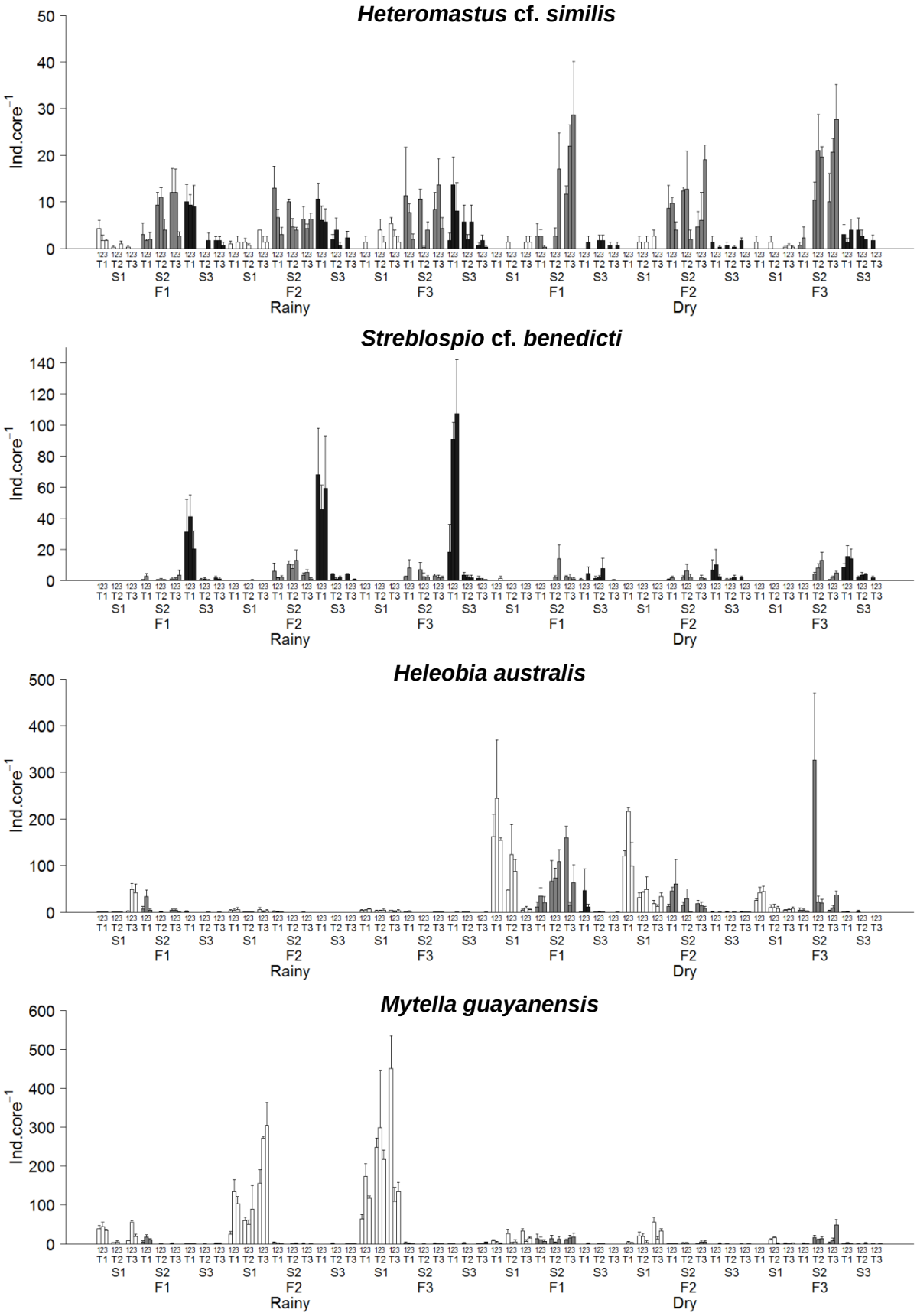


Fig. 4 Mean values (±SE) for taxa richness, total abundance and individual taxa abundance of the intertidal macrobenthic on the subtropical system. Sectors were represented by colors (*white:* S1-upstream, *grey*: S2-intermediate and *black*: S3-

downstream) which included different tidal flats for each sector (T1, T2 and T3) and location (1, 2 and 3) within tidal flats. Sampling was performed in three fortnights during rainy and dry seasons.

Macrobenthic assemblages differed significantly at all considered spatial and temporal scales and interactions (Table 3). The largest spatial scale (Sector) and residuals were the most relevant for total variance, accounting for about 47% and 21%, respectively. Marked spatial differences were expected in faunal composition, since each sector supports significantly different macrobenthic assemblages. Although three distinct taxa groups were established across the estuarine gradient, there was considerable variability among samples in the outer sector in the rainy season and both in the intermediate and outer sectors in the dry season (Fig. 5). In addition, there were considerable assemblage overlapping between the intermediate and outer sectors, mainly in dry season, suggesting a a gradual change in faunal assemblages. The amphipod *M. acherusicum*, and the tanaids *Monokalliapseudes schubarti* and *Sinelobus stanfordi* were the taxa that most contributed to the observed dissimilarities between the inner and intermediate or outer sectors. The polychaetes *Aricidea* spp. and *L. pandoensis* and unidentified oligochaete species mostly contributed to dissimilarities between the intermediate and outer sectors. Seasons were mostly distinguished by variation in unidentified oligochaete species, the polychaete *L. pandoensis* and the gastropod *H. australis* (SIMPER, Appendix 2).

Fig. 5 Macroinfaunal assemblages from subtropical estuarine system compared by nMDS ordination with all samples and separated by season (summer and winter). Sectors were performed by colors (*white:* S1-upstream, *grey*: S2-intermediate and *black*: S3-downstream) and tidal flats by symbols (T1 = *circle*, T2 = *square*, T3 = *diamond* and T4 = *triangle*).

Table 3 Summary of multivariate analyses of variance (PERMANOVA) based on the Bray–Curtis dissimilarities with fourth root transformed data performed for macroinfaunal assemblages on the subtropical estuarine system. We considered the spatial factors (Sector, Tidal flats nested in Sector and Location nested in Tidal flats and Sector) orthogonal to temporal factors (Season and Fortnights nested in Season). VC% = variance component as percentages of the total. *df* = degrees of freedom, n = 3 replicates, 9999 permutations. *p* values calculated through the Monte Carlo permutation test. Significant differences are given in bold (p<0.05).

Source	df	MS	*Pseudo-F*	p	%VC
Season = Se	1	58032	5.814	**0.0002**	5.84
Sector = S	2	2.79E+05	20.555	**0.0001**	46.77
Fortnight (Se) = F (Se)	4	4913.3	1.8456	**0.0138**	0.79
Tidal flats (S) = T(S)	6	9829.7	2.7547	**0.0001**	3.61
Se x S	2	33039	3.7945	**0.0001**	9.17
Location (T(S)) = L(T(S))	18	1270	1.2675	**0.0405**	0.42
Se x T(S)	6	5526.1	1.641	**0.0059**	2.67
F(Se) x S	8	3882.4	1.4584	**0.0375**	1.28
Se x L(T(S))	18	1316	1.3134	**0.0222**	0.99
F(Se) x T(S)	24	2662.1	2.6569	**0.0001**	5.21
F(Se) x L(T(S))	72	1002	1.3671	**0.0001**	2.53
Residuals	324	732.91			20.71
Total	485				

2.4. Discussion

The hypothesis that large-scale variability in composition and overall abundance of intertidal macrobenthic assemblages will be always higher than small-scale variability was not refuted. In fact, three distinct assemblages (or species groups) referred to previously selected sectors were always recognized over time, as a response to the primary role played by salinity, pH, depth of redox discontinuity layer and sediment texture in explaining overall distribution patterns. Overall macrobenthic abundance was highest upstream and significantly decreased towards the intermediate and outer sectors, which did not differ between themselves. Differences were clearly associated with the high density of crustaceans in the inner sector, represented by the four numerically dominant taxa: the amphipod *M. acherusicum*, the tanaids *M. schubarti* and *S. stanfordi*, and an unidentified ostracod. Our results also conflict with marked seasonal variation patterns in macrobenthic abundance previously reported for other temperate, subtropical and tropical estuarine systems (França et al. 2009; Fonseca and Netto 2006; Rosa Filho and Aviz 2013; Ortega-Cisneros and Scharler 2014). In our case, overall macrobenthic abundance was not significantly responsive to fortnightly or seasonal changes.

However, variations in number of species and in the density of some numerically dominant taxa (unidentified oligochaete species and polychaetes *H. similis* and *S. benedicti*) refuted our main working hypothesis. These faunal variables were also significantly affected by spatiotemporal interactions at small scales. Such small-scale variability was clearly related with the quality and quantity of organic matter, as expressed by local variations in total organic carbon, photosynthetic pigments, and nutrient contents. Small-scale variability over time was expressed by gradual changes in assemblage composition mainly in the intermediate and outer sectors, evident both at fortnight and seasonal scales (mainly in dry season). Our observed pattern is only partially congruent with the ecocline model (Attrill and Rundle 2002), which predicts species overlapping mainly in response to the salinity gradient.

So, the effect of distinct sets of physicochemical variables on macrobenthic distribution patterns could be discriminated simultaneously at both large and small-scales. Large-scale spatial patterns in the distribution of intertidal macrobenthic assemblages were largely congruent to those described in Chapter 1 for a sampling design hierarchized only in space, but a more complex framework emerged from the incorporation of short-time temporal variation. Complex patterns in faunal composition and distribution are expected in estuaries, which are considered naturally stressed areas and thus physicochemically more variable than other aquatic systems (Elliott and Quintino 2007; Elliott and Whitfield 2011). Many conceptual estuarine models currently available in the literature are based on putative linear variations in diversity, abundance and distribution along a salinity continuum, from freshwater to marine conditions (Whitfield et al. 2012). In a similar way, predictive statistical models have suggested that the presence or absence of individual macrobenthic species are strongly and directly coupled to physicochemical processes at large scales, which would explain their longitudinal estuarine distribution mostly associated with salinity, depth, current velocity and sediment texture (Ysebaert et al. 2002). Caution should be taken in developing such conceptual models and in hoping that they can be generalized. Although we have ratified the primary role played by salinity and co-variant drivers at the km-scale, a more complex estuarine model emerged from our findings. As other authors (Morrissey et al. 1992; Chapman 2002; Bulleri and Chapman 2004; Chapman et al. 2010), we showed that variation is also relevant at short spatial and temporal scales,

mainly in the intermediate and outer estuarine sectors. In our case, this was particularly true for number of species. Although salinity values always varied linearly from the inner to the intermediate and outer sectors, there was non-linear trends in number of species, which was primarily affected by 100 m's to m- scales and fortnight scales.

Responses of individual species to large- and small-scale drivers were highly variable. Variance associated with space (large-scale, among sectors) was always greater than variance associated with time or spatiotemporal interactions for some species (*M. acherusicum*, unidentified ostracod, *N. fluviatilis*, *Aricidea* spp., *H. australis* and *M. guayanensis*). Conversely, some species (unidentified oligochaete, *H. similis* and *S. benedicti*) occurred in highly variable patches over space and time, and were consistently responsive to small-scale drivers. This is inconsistent with patterns described by Ysebaert and Herman (2002), who concluded that estuarine species adapt to local (10 m to 100 m scale) average conditions but are relatively insensitive to short-term or very small-scale variations in their environment. The detritivore polychaete *L. pandoensis* was the only species primarily responsive to the large-scale interaction between Season and Sector, by shifting higher densities in the intermediate sector in the more rainy summer to in the inner sector in winter. Population patches of *L. pandoensis* (= *L. culveri*) are usually associated with temporary tidal creeks formed after heavy rainfall and pulses of organic matter (Martin and Bastida 2006). This inference is further supported by the observed variations in salinity, total organic carbon and organic matter content, which were also primarily or secondarily driven by the interaction between Season and Sector.

Although we have not addressed the potential role played by biological interactions, macrobenthic abundance at small scales is admittedly regulated by predation or inter- and intra-specific competition (Underwood et al. 2000; Elliott and Whitfield 2011). Ysebaert and Herman (2002) also remarked that many dominant species from a temperate estuary showed little dependence on salinity variation. However, they also recognized clear differences in assemblage composition at larger scales, in agreement with our results.

Our findings are consistent with the fact that many benthic patterns tend to be markedly heterogeneous at small-scales from 10s m to < 1 m (Chapman et al. 2010). Giménez et al. (2014) suggested that even their robust sampling design, which combined space and time over 5 months, may not have captured relevant

short-term variation in salinity and temperature that could contribute to differences in number of species and abundance of the species. Therefore, the resulting patterns described herein should not be interpreted as the only and necessary output of varying physiological tolerance of individual taxa or species groups to a marked salinity gradient. In fact, overall variation was also dependent on factors operating at small-spatial scales, such as quality and quantity of organic matter. In this context, lack of adequate sampling replication at shorter temporal and spatial scales may confound variability detection and obscure any potential variations within the marked salinity gradients in most estuaries.

2.5. Conclusions

Our findings suggest that relationships between intertidal macrobenthic assemblages and estuarine gradients are more complex than those predicted by other estuarine systems. Our theoretical framework devises an estuary as a multidimensional niche clearly dominated by the salinity gradient, but also dependent on other abiotic and biotic drivers which operate at multiple spatial and temporal scales. Short- and large-scale spatiotemporal variation will thereby increase or reduce the proportion of the fundamental niche that is ultimately occupied by an estuarine species.

Sampling designs whereby small scales are nested within large scales in both time and space will minimize uncertainty in trend estimates, and optimize sampling efforts. Even if the complex resulting interactions among factors are more difficult to interpret (Elliott and Quintino 2007; Elliott and Whitfield 2011), our approach combining space and time interactions was useful in showing how small-scale variation may further affect and regulate macrobenthic assemblages mostly structured by salinity as a major driver.

Further research to determine variability at additional temporal scales, including yearly and decadal variation, could be potentially rewarding. There is a clear need for adequate temporal replication with enough power to detect changes related to the projected climate changes. Understanding the combined effects of multiple spatial and temporal scales is also necessary to design more effective monitoring programs (Rhodes and Jonzén 2011). We suggest that hierarchical sampling designs crossed at distinct spatial and temporal scales should be applied to more estuaries worldwide. Comparative analyses, under a broader macroecological

perspective, would provide a better validity test to patterns in the macrobenthic estuarine assemblages currently available in the literature.

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SUPPLEMENTARY MATERIAL

Appendix 1

List of the macroinfaunal taxa with Total abundance, average abundance (mean ± SE) and occurrence frequency (%OF) found along estuarine gradient on the subtropical system during rainy and dry seasons on the 2012.

Phylum/Class	Taxa	Total abundance	Mean ± SE	%OF
Cnidaria	Ceriantharia sp.1	2	0.004 ± 0.003	0.41
	unidentified Cnidaria	2	0.004 ± 0.003	0.41
	Edwardisiidae sp.1	341	0.685 ± 0.127	15.84
	Cnidaria – simple Polyp sp.1	282	0.58 ± 0.202	5.14
	Cnidaria – branched Polyp sp.1	19	0.039 ± 0.037	0.41
Phoronida	*Phoronis* sp.1	357	0.735 ± 0.127	18.31
Sipuncula	Sipuncula	1	0.002 ± 0.002	0.21
Nemertea	Nemertea sp.1	283	0.765 ± 0.069	35.19
Platyhelminthes	Plathelminthes sp.1	88	0.181 ± 0.047	7.61
Annelida	Hirudinea sp.1	148	0.305 ± 0.059	7.61
	Oligochaeta	18441	37.944 ± 3.584	73.05
Polychaeta	*Alitta succinea*	336	0.691 ± 0.112	14.81
	Aricidea cf. *albatrossae*	8438	17.362 ± 2.068	31.28
	Aricidea cf. *fragilis*	272	0.56 ± 0.185	6.17
	Aricidea sp.	5	0.01 ± 0.01	0.21
	Armandia hossfeldi	103	0.212 ± 0.052	7.41
	Boccardiella cf. *truncata*	117	0.241 ± 0.067	4.32
	Capitella cf. *capitata*	2435	5.01 ± 0.737	26.95
	Diopatra sp.1	4	0.008 ± 0.004	0.82
	Dipolydora socialis	12	0.025 ± 0.012	1.23
	Exogone sp.1	12	0.025 ± 0.011	1.44
	Glycinde multidens	408	0.84 ± 0.079	30.04
	Goniada littorea	1	0.002 ± 0.002	0.21
	Goniada maculata	3	0.006 ± 0.004	0.62
	unidentified Goniadidae	1	0.002 ± 0.002	0.21
	Hemipodia simplex	3	0.006 ± 0.004	0.62
	Hermundura tricuspis	165	0.34 ± 0.038	19.55
	Heteromastus cf. *similis*	1922	3.955 ± 0.303	52.47
	Hyalinoecia sp.1	2	0.004 ± 0.004	0.21
	Isolda pulchella	296	0.609 ± 0.064	25.72
	Isolda sp.	1	0.002 ± 0.002	0.21
	Laeonereis pandoensis	8027	16.516 ± 1.501	57.2
	Leiocapitellides sp.1	5	0.01 ± 0.005	1.03
	Leitoscoloplos kerguelensis	2	0.004 ± 0.003	0.41
	Lumbrineridae sp.1	25	0.051 ± 0.013	3.7
	Magelona papillicornis	545	1.121 ± 0.126	22.84
	Magelona posterelongata	1	0.002 ± 0.002	0.21
	Mediomastus sp.1	1477	3.039 ± 0.324	25.93

	Myrianida sp.	1	0.002 ± 0.002	0.21
	Nephtys fluviatilis	4752	9.778 ± 0.545	65.64
	Nereis oligohalina	4	0.008 ± 0.008	0.21
	Nereis sp.1	27	0.056 ± 0.028	1.85
	Notomastus sp.1	9	0.019 ± 0.007	1.44
	Odontosyllis sp.1	3	0.006 ± 0.006	0.21
	unidentified Onuphidae	1	0.002 ± 0.002	0.21
	Oxydromus sp.1	12	0.025 ± 0.008	2.26
	unidentified Orbinidae	1	0.002 ± 0.002	0.21
	Pholoididae sp.1	2	0.004 ± 0.003	0.41
	Phyllodoce pettiboneae	18	0.037 ± 0.011	2.88
	unidentified Phyllodocidae	1	0.002 ± 0.002	0.21
	Poecilochaetus sp.1	6	0.012 ± 0.005	1.23
	Prionospio multibranchiata	61	0.126 ± 0.053	5.76
	Prionospio pinnata	5	0.01 ± 0.005	1.03
	Sabellidae sp.1	2	0.004 ± 0.003	0.41
	Scoloplos cf. *rubra*	268	0.551 ± 0.069	20.78
	Sigambra grubii	936	1.926 ± 0.171	44.03
	*Sigamb*ra sp.1	1	0.002 ± 0.002	0.21
	Spiochaetopterus sp.1	1	0.002 ± 0.002	0.21
	Spionidae sp.1	4	0.008 ± 0.004	0.82
	Spiophanes duplex	38	0.078 ± 0.017	5.56
	Streblospio cf. *benedicti*	2264	4.658 ± 0.735	37.86
Mollusca				
Bivalvia	*Anomalocardia flexuosa*	464	0.955 ± 0.163	15.02
	Corbula sp.1	8	0.016 ± 0.006	1.65
	Juvenile bivalves	4	0.006 ± 0.006	0.21
	Phacoides pectinatus	28	0.058 ± 0.013	4.53
	Macoma constricta	50	0.103 ± 0.021	6.17
	Macoma tenta	375	0.772 ± 0.154	9.47
	Mytella guayanensis	11442	23.543 ± 3.053	57.2
	Pitar cf. *fulminata*	3	0.006 ± 0.006	0.21
	Tagelus cf. *plebeius*	256	0.527 ± 0.11	11.32
	Tagelus divisus	134	0.276 ± 0.051	10.29
	Tellina cf. *versicolor*	47	0.097 ± 0.017	7.61
	Tellina sp.1	169	0.348 ± 0.067	10.7
	Veneridae sp.1	2	0.004 ± 0.003	0.41
Gastropoda	*Bulla* sp.1	292	0.601 ± 0.098	14.61
	Epitonium cf. *celesti*	1	0.002 ± 0.002	0.21
	unidentified Gastropoda	1	0.002 ± 0.002	0.21
	Heleobia australis	9267	19.068 ± 2.408	53.09
	Nassarius polygonatus	2	0.004 ± 0.003	0.41
	Solariorbis schumoi	75	0.154 ± 0.104	3.09
	Stramonita haemastoma	1	0.002 ± 0.002	0.21
	Nudibranchia sp.1	9	0.019 ± 0.007	1.65
Arthropoda				

Crustacea	Harpacticoida sp.1	64	0.132 ± 0.053	3.7
	Harpacticoida sp.2	293	0.603 ± 0.231	4.32
	Cumacea sp.1	53	0.109 ± 0.026	4.73
Amphipod	Corophiidae sp.1	279	0.574 ± 0.159	6.58
	Gammaridea sp.1	4300	8.848 ± 1.007	25.72
	Gammaridea sp.2	5	0.01 ± 0.005	1.03
	Gammaridea sp.3	128	0.263 ± 0.118	1.85
	Gammaridea sp.4	1	0.002 ± 0.002	0.21
	Monocorophium acherusicum	158351	325.825 ± 30.089	34.77
	Senticaudata sp.1	255	0.525 ± 0.139	11.93
Isopoda	*Ancinus seticomvus*	2	0.004 ± 0.004	0.21
	Cassidinidea fluminensis	3843	7.907 ± 1.069	25.1
	Pseudosphaeroma cf. *jakobii*	236	0.486 ± 0.145	5.56
	Uromunna cf. *peterseni*	2925	6.019 ± 0.763	25.93
Tanaidacea	*Monokalliapseudes schubarti*	50745	104.414 ± 9.277	36.83
	Sinelobus stanfordi	34450	70.885 ± 6.559	32.72
Ostracoda	Ostracoda	32409	66.685 ± 6.439	66.67
Brachyura	Ciclodorippidae	1	0.002 ± 0.002	0.21
	Brachyura Megalopa	503	1.035 ± 0.111	30.04
	Callinectes sp.1 (juvenile)	100	0.206 ± 0.046	7.82
	Uca maracoani	1	0.002 ± 0.002	0.21
	Uca sp.	4	0.008 ± 0.008	0.21
	Uca thayeri	250	0.514 ± 0.071	14.61
	Panopeidae sp.1	322	0.663 ± 0.094	15.23
	Alpheus sp.1	41	0.084 ± 0.016	6.38
Insecta	Acari sp.1	5	0.01 ± 0.005	1.03
	Ceratopogonidae sp.1	93	0.191 ± 0.085	4.73
	Chironomidae sp.1	15293	31.467 ± 4.768	29.01
	Colembola	1	0.002 ± 0.002	0.21
	Dolichopodidae	1	0.002 ± 0.002	0.21
	Insect larva sp.1	31	0.064 ± 0.021	2.47
	pupae of Diptera	488	0.936 ± 0.132	14.2
	Plecoptera	4	0.008 ± 0.008	0.21
	Trichoptera sp.1	42	0.086 ± 0.034	1.44
	Trichoptera sp.2	5	0.01 ± 0.005	0.82
Echinodermata	Ophiuroidea	2	0.004 ± 0.003	0.41

Appendix 2

Similarity percentages analysis (SIMPER) with contribution for each taxa (%) that most contributed to dissimilarities among sectors (S1 = inner, S2 = intermediate and S3 = outer) and seasons (Rainy-R and Dry-D) at the cutoff level 50%. The top 3 taxa for each comparison are given in bold..

Taxa	% (S1 vs. S2)	% (S1 vs. S3)	% (S2 vs. S3)	% (R vs. D)
Monocorophium acherusicum	**11.45**	**10.16**	**-**	-
Monokalliapseudes schubarti	**9.16**	**8.26**	-	-
Sinelobus stanfordi	**7.63**	**6.78**	-	-
Ostracoda	6.58	5.32	3.9	4.59
Chironomidae	5.47	4.82	-	-
Laeonereis pandoensis	4.22	-	**5.12**	**6.06**
Mytella guayanensis	3.93	3.77	3.5	3.84
Gammaridea	-	3.42	-	-
Oligochaeta	-	-	**5.9**	**6.13**
Capitella sp.	-	-	3.59	3.58
Heteromastus cf. *similis*	-	-	3.84	3.57
Heleobia australis	-	-	5.02	**4.66**
Nephtys fluviatilis	-	3.94	4.37	2.93
Aricidea spp.	-	3.93	**6.86**	3.25
Mediomastus sp.	-	-	4.53	-
Sigambra grubii	-	-	-	2.75
Magelona papillicornis	-	-	3.46	-
Streblospio cf. *benedicti*	-	-	-	3.4
Glycinde multidens	-	-	-	2.3
Nemertea	-	-	-	2.18

Capítulo 3

Avaliando a diversidade de traços funcionais do macrobentos em múltiplas escalas ao longo de um gradiente estuarino subtropical

Assessing macrobenthic functional trait diversity at multiple scales along a subtropical estuarine gradient

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Assessing macrobenthic functional trait diversity at multiple scales along a subtropical estuarine gradient

Gisele C. Morais[1,2*]; João B. L. Gusmao-Junior[1,2,4], Verônica M. Oliveira[3] & Paulo Lana[2]

[1] Postgraduate Program in Coastal and Oceanic Systems (PGSISCO) from Universidade Federal do Paraná.

[2] Centro de Estudos do Mar, Universidade Federal do Paraná. Av. Beira-Mar, s/n, Pontal do Sul, CEP 83255-976, PO Box 61, Pontal do Paraná, Paraná, Brasil.

[3] Departamento de Química e Biologia, Universidade Estadual do Maranhão. Cidade Universitária Paulo VI, s/n, Tiririca, CEP 65055-970, PO Box 09, São Luís, Maranhão.

[4] Department of Marine Benthic Ecology and Evolution (MarBEE), Groningen Institute for Evolutionary Life Sciences (GELIFES), University of Groningen, 9700 CC, Groningen, The Netherlands.

* Corresponding author

E-mail addressess: gisellymorais@gmail.com (G.C. Morais)

[2] Tel.: +55 41 35118600; fax: +55 41 35118648

ABSTRACT

Multi-trait approaches have been extensively used to describe the functional trait diversity of benthic communities in freshwater and marine environments. However, studies investigating functioning based on biological traits in tropical and subtropical estuarine systems are still scant. This study assesses the variation patterns in the functional diversity of intertidal benthic assemblages, expressed by variation in number of species and biological traits (functional diversity and composition) along a subtropical estuarine system in southern Brazil, using a sampling design hierarchized in time and space. The hypothesis that the functional trait diversity of macrobenthic assemblages will be mainly driven by the largest spatial scales (salinity sectors) was not refuted. The congruence of changes in functional diversity and composition with changes in salinity, pH, redox discontinuity layer and grain size, indicate that large-scale environmental drivers do condition the establishment of species sets with specific traits. However, small-scale variations in trait distribution also indicate the relative importance of photosynthetic pigments, total organic carbon, organic matter

and phosphorus for overall functional changes. The lower functional redundancy in the outer sector suggests an increased likelihood of loss in potential functions with the local removal of species. Thus, progressive loss of functional redundancy downstream makes the high energy euhaline sector a preferential target for management efforts.

KEY WORDS: BTA - biological traits - functional diversity - estuary functioning.

3.1. INTRODUCTION

Estuarine species are adapted to highly variable physical and geochemical drivers that operate at different spatial and temporal scales (Gray & Elliott 2009). They may play a relevant role in regulating or modulating ecosystem properties and processes (McLusky & Elliott 2004, Gray & Elliott 2009). For instance, macrobenthic assemblages control and regulate sediment stability, remineralization of organic matter and nutrient exchange through the sediment-water interface (Reise 2002, Elliott & Quintino 2007, Elliott & Whitfield 2011).

The combined effects of natural and anthropogenic disturbance may affect the structure of estuarine ecosystems (Elliott & Quintino 2007, Mouillot et al. 2013) and hence modulate their functioning. In this context, the functioning of estuarine ecosystems is related to species diversity and their relative abundance, but also to functional diversity (Bremner 2008, Elliott & Whitfield 2011). Functional diversity is defined herein as the extent of dissimilarity of functional traits with which organisms are distinguished in a given community. In other words, it basically concerns the range of things that organisms do in communities and ecosystems (Petchey & Gaston 2006). A number of often contradictory hypotheses have been put forward to explain how functional diversity impact on ecosystem processes (Johnson et al. 1996, Gray & Elliott 2009): a) all species are functionally equivalent and the removal of any of them may alter overall functioning; in this case, loss of ecosystem function will be proportional to the number of lost species; b) if a critical or key-species is removed and not replaced, functional processes will change abruptly; c) since most species display few interactions with other species, the loss of a given species will have little overall impact on ecosystem functioning unless critical species are lost; d) there are no patterns or consistent relationships between species composition and ecosystem functioning.

Functional redundancy can imply some level of ecosystem resilience due to environmental drivers operating at diverse spatial and temporal scales. Resilience may thus express the resistance to or ability to absorb change, which will depend on the amount of inherent complexity/variability of an ecosystem (Elliott et al. 2007). The degree to which any given community or ecosystem is likely to present functionally redundant species will depend on their species richness, composition and disturbance levels (Rosenfeld 2002, Gray & Elliott 2009). Since estuarine systems are often species-poor, due to their high physicochemical variability, their putative lack of species redundancy needs to be carefully assessed, moreover if they are also exposed to anthropogenic pressure (Elliott & Whitfield 2011). Despite their low diversity, estuaries display a high resilience to change when compared to more stable aquatic environments, such as rivers and lakes (Elliott & Whitfield, 2011).

There has been a growing interest over the last decade in using functional diversity to investigate ecosystem functioning, and to detect environmental changes as a basis for management and conservation (Elliott & Quintino 2007, Bremner 2008). Analyses of functional diversity based on biological traits look more powerful than traditional approaches, such as taxonomic composition (Ysebaert & Herman 2002) or feeding guilds (Pagliosa et al. 2012), for assessing ecosystem functioning at both large and small scales in benthic environments (Bremner et al. 2003).

Recent approaches have been proposed to assess changes in the functional trait diversity of assemblages based on measures of the functional traits, such as functional diversity indices and biological traits analysis (Bremner 2008, Mouillot et al. 2013, Petchey & Gaston 2006). Rao's quadratic entropy is a multivariate index based on the Simpson diversity index and weights the trait-based distances between pairs of species by the product of their relative abundances (Botta-Dukát 2005). Changes in functional entropy (Rao's index) reflect changes in the abundance-weighted sum of pairwise functional distances between species (Mouillot et al. 2013). This index surpasses other proposed indices because it includes species abundance and more than one trait (Botta-Dukát 2005). Conversely, Biological Traits Analysis (BTA) incorporates a number of life history, morphological and behavioural characteristics of species present in assemblages to assess their role in the maintenance and regulation of ecosystem processes (Bremner et al. 2003). It does this by utilizing species traits and their occurrence over assemblages (Bremner 2008). BTA basically states that species' characteristics result from habitat constraints. As such, BTA will

provide information about how species respond to natural gradients or stress, thereby indicating the state of the environment. BTA uses multivariate ordination to describe patterns of biological trait composition over entire assemblages, i.e. the types of trait present in assemblages and the relative frequency with which they occur (Bremner et al. 2006).

Although widely applied to freshwater and marine environments (Bremner 2008), the usage of a functional diversity index and BTA to assess estuarine gradients is still scant (van der Linden et al. 2012, Veríssimo et al. 2012, Darr et al., 2014, Törnroos et al. 2015). This is particularly evident in the case of tropical and subtropical estuaries. Therefore, we still have little understanding about which ecological functions are driving responses of benthic assemblages or, indeed, the functional consequences of short-time variation in tropical and subtropical estuarine gradients.

In this paper, we assess variation patterns in the functional diversity of intertidal benthic assemblages, expressed by variation in number of species and biological traits (functional diversity and composition) along a subtropical estuarine system in southern Brazil. It is well known that species composition varies markedly along estuarine gradients, and it can be predicted that the functional diversity of estuarine assemblages, expressed by their biological traits, will change accordingly over space and time. Since spatial patterns of macrobenthic distribution can be temporally inconsistent (Morrissey et al. 1992, Chapman et al. 2010), we investigate how short-term temporal changes (from fortnights to seasons) will affect macrobenthic functional trait diversity at varying spatial scales (from meters to kilometers) along an estuarine gradient. We hypothesize that if the functional diversity of macrobenthic assemblages is mainly driven by the salinity gradient (van der Linden et al. 2012), then variations in functional diversity and trait composition will be also larger at large spatial scales and will be little affected by short-term temporal variation. We tested these predictions by using measures of the functional traits on a hierarchical sampling design. These combined methods may constitute a new informative approach to assessing the functioning of subtropical estuarine systems.

3.2. MATERIALS AND METHODS

Study site

The study was carried out in the Guaratuba Bay, a 15 km subtropical estuarine system located on Paraná state, southern Brazil (25º52'38.03''S and 48º38'17.82''W). The Paraná coastal zone is characterized by seasonal humid subtropical climate (Cfa Koeppen's classification). A typical rainy season initiates in late spring and lasts during most of the summer while the dry season lasts from late autumn to late winter. The mean annual rainfall is 2500 mm (maximum 5300) and around 85% mean air humidity. Average rainfall during the rainy season is more than three times higher than during the dry season (Lana et al. 2001).

The estuary is shallow at the inner areas, with an average depth of 3 m, but down to 27 m. The main rivers located in the inner region have a combined average annual discharge of about 80 $m^3 s^{-1}$ (Marone et al. 2006). Tides are semi-diurnal with diurnal inequalities and may reach up to 2 m at the mouth of the bay during spring tides (Marone et al. 2006). Estimated tidal current velocity is up to 2.3 m s^{-1} and residence time of water is approximately 9.3 days (Marone et al. 2006). The estuary has high salinity fluctuations with a strong horizontal and vertical stratification, especially during the rainy season (Marone et al. 2006, Brandini 2008). Three sectors can be differentiated according to the salinity gradient: upstream sector, dominated by fluvial processes with salinity ranging from 0 to 10; central sector, characterized by a mixing zone with salinity varying between 10 and 27; and downstream sector, dominated by marine processes with salinity ranging from 23 to 34 (Brandini 2008, Mizerkowski et al. 2012).

The estuarine system consists of a mosaic of ecosystems, such as tidal flats, mangroves, marshes and seagrass beds. The tidal flats represent 24% of the surface area and are composed by poorly selected sediments characterized by fine sand and silt (Marone et al. 2006, Noernberg et al. 2008, Cotovicz Junior et al. 2014). Guaratuba Bay is an environmental protection area where the main economic activities are traditional fishing and oyster farming. However, the estuary receives effluent discharge of livestock and agriculture that develops around the main rivers that flow into the system, which may threaten the environmental quality of the estuary (Sanders et al. 2006, Combi et al. 2013, Cotovicz Junior et al. 2014).

Sampling and laboratory procedures

We carried out sampling on unvegetated tidal flats along the estuarine gradient to assess the variability of macrobenthic traits. We used the same dataset from Chapter 2. Sampling design included hierarchical approaches involving spatial and temporal scales. Field sampling were conducted in 2012: the end of the rainy (March-April) and dry (October-November) seasons. Samples were undertaken in three subsequent fortnights in each seasonal period and during 3 or 4 consecutive days for each fortnight. The spatial design incorporated three sampling sectors distanced in the scale of kilometers (10^3 m) following the salinity gradient (see map in Chapter 2 for details). The sectors were denominated as inner or oligohaline (S1), intermediate or mesohaline to polyhaline (S2) and outer or polyhaline to euhaline (S3). In each sector, three tidal flats separated by several hundred meters (10^2 m) were selected. Tidal flat were carefully selected across the estuarine gradient to avoid the putative effects of freshwater discharge from rivers and tidal creeks. For each tidal flat, three locations (separated by at least 10 m) were randomly chosen and placed parallel to the water line, at similar tidal levels. Locations were 4 m² in area, in which three sampling plots of 0.25 m² were randomly distributed. Samples of the benthic fauna were taken in each sampling plot with plastic core tubes of 15 cm diameter and 10 cm high.

For each location, sediment temperature was measured with a precision digital thermometer inserted to a 10 cm depth. Also, three measures of the depth redox discontinuity layer (RDL) of the sediment was taken with a ruler. This was determined visually as considering the maximum depth range limit of sediment color change from light color sediment (oxygen-rich) to a darker layer (oxygen-poor). In addition, at each location salinity and pH were measured from water percolation in sediment, with a refractometer and a pH meter, respectively.

Additional sediment samples were collected at each location with plastic core tubes (5 cm diameter and 10 cm in depth) to assess the particle size, organic matter (O.M.) and calcium carbonate ($CaCO_3$) contents. A sample of surface sediment (approximately 10 g in 1 cm depth) were collected for nutrient analysis (total organic carbon, phosphorus and nitrogen). Another superficial sediment sample (approximately 2 g) was taken for analysis of chlorophyll-a and phaeopigments content. All sediment samples for biogeochemical analyzes were taken to the

laboratory under refrigerated and dark conditions, kept at -20^{o}C, then dried and macerated, except in the case of photosynthetic pigments, for further processing.

Sediment samples for faunal analysis were fixed in 4% formaldehyde and conserved in 70% alcohol solution with Rose bengal stain. For separation of organic material were used sieves with a mesh of 0.5 mm. Subsampling and flotation with a sugar solution (>1.2 g/ml) was necessary for the samples from the inner sector due to the high amount of detritus. Animals were identified to species or morphotype levels and counted.

Laboratory procedures for granulometry, calcium carbonate ($CaCO_3$), organic matter, nutrients contents (organic carbon - COT, nitrogen - N and phosphorus - P) and photosynthetic pigments (Chlorophyll-a: Chl and Phaeopigments: Pha) analysis followed the same techniques and routines described in Chapter 1. The molar N:P and C: N ratios were used to assess the nutrient limitation and relative contribution of autochthonous and allochthonous inputs of organic matter along the estuarine gradient. Organic matter quality was determined by the ratio of phaeopigments to the sum of chlorophyll-a and phaeopigments (PAP ratio). It was calculated as an indication of the freshness or degradation conditions of the material deposited in the sediment (Boon et al. 1998).

Data processing

A Principal Components Analysis (PCA) was performed to visualize patterns of spatial and temporal variation based on the physicochemical variables along the estuarine gradient. Physicochemical variables included temperature, redox discontinuity layer, salinity, pH, chlorophyll-*a*, phaeopigments, total organic carbon, nitrogen, phosphorus, organic matter, calcium carbonate, mean grain size, and the variability of the molar N:P ratio, molar C:N ratio and PAP ratio. This analysis was built with 81 samples for each season (rainy and dry) for abiotic datasets. We used standardized abiotic matrices and excluded collinear variables using Pearson's correlation coefficient.

Macrobenthic taxa were classified into biological traits based on information gathered from regional and international literature (i.e., Arruda et al. 2003, Pagliosa et al. 2012, Jumars et al. 2015), online databases, as BIOTIC-Biological Traits Information Catalogue (http://www.marlin.ac.uk/biotic/), WoRMS - World Register of Marine Species (http://www.marinespecies.org/) and information from nearest

phylogenetic neighbor or the ad hoc opinion of specialists. Classification were carried out considering different functional traits which reflected taxa morphology, life history, behavior and ecological adaptations (Table 1).

Table 1. Biological traits and categories used to describe the functional diversity of macrobenthic meetings on the subtropical estuarine system.

Biological traits	**Categories**
Body size (organisms size according empirical data collected)	≤ 5 mm 5 to 10 mm 10 to 20 mm 20 to 40 mm 40 to 80 mm 80 to 160 mm > 160 mm
Body design	Soft Soft protected (tube/gallery/tunic cover) Hard exoeskeleton Hard shell
Development	Direct Indirect
Depth	Surface 0 to 3 cm 3 to 8 cm 8 to 15 cm 15 to 25 cm > 25 cm
Bioturbation	None Biodiffuser Gallery diffuser Upward conveyor Downward conveyor Bio-irrigator
Adult movement	Sessile/sedentary Swim Crawl Burrow/tube
Relative adult mobility	None Low Medium High
Feeding mode	Deposit feeder Suspension Opportunist/Scanveger Grazer Carnivore/Predator

Body size trait was classified according to our empirical results. Rare taxa with less than 10 individuals in total abundance were not included in the analysis. Then, abundant taxa were singly coded for categories of each trait using a fuzzy-coding procedure (Chevenet et al. 1994). Fuzzy coding uses scores to describe the affinity of taxa for different categories of a given biological trait. We used a fixed score range from 0 to 3, with 0 meaning no affinity to a given category and 3 as total affinity. Intermediate scores between 0 to 3 were used when a same taxon shared various biological trait categories (matrix “taxa by traits”, Table S1).

Functional diversity was computed with Rao’s quadratic entropy according to Botta-Dukát (2005). Rao’s index for functional diversity incorporates both the relative abundances of species and a measure of the pairwise functional differences between species expressed as the distances between species in a multivariate trait space. We calculated the pairwise differences using Euclidean distances based on the functional trait matrix. Higher values of Rao’s index is expected when species are widely overspread in the multivariate trait space (high multivariate dispersion) and when the abundances are not concentrated in group of taxons with similar functional traits. This index was calculated for all 486 samples.

Spatial and temporal variations in the number of species and functional diversity were evaluated using analysis of variance (ANOVAs). The mixed linear model consisted of three nested spatial factors orthogonal at two nested temporal factors: Sector (fixed; three levels; inner, intermediate and outer), Tidal flats (random, three levels; nested in Sectors), Location (random; three levels; nested in Tidal flats with 3 replicates); and Season (fixed; two levels; rainy and dry), Fortnight (random; three levels; nested in Seasons). We used a quasi F-ratio (Quinn & Keough 2002) calculated by a linear combination of mean square for tested terms without an appropriated F-ratio in the ANOVA (Season, Sector, Tidal flat within Sector, interactions: Season X Sector, Season X Tidal flat). Means were compared using Student-Newman-Keuls test (SNK) in the case of terms significant at $p<0.05$.

Homogeneity of variances was assessed using Cochran’s test at the 0.05 significance level. However, we ran the tests even when transformations did not meet the assumptions, because ANOVA tests are still robust when the design is balanced and with appropriate replication (Underwood 1997). Besides, a variance component analysis (VC%) was used to estimate the amount of variation for each source of spatial and temporal variability or interactions between them. The significance of a

factor (presented in the form of probability-values) describes how likely the patterns explained by the factor are simply due to random chance and thus serve no functional importance to the researcher (Graham & Edwards 2001). Additionally, significance (*p* values) is inherently dependent on the amount of sample while determination of fit (measured as VC%) is an estimate of the variance in a response variable that can be explained by the factor. Therefore, the approach adopted here considers the proportion of total variance as the best estimate of the contribution of a given factor to variability in a response variable, as suggested by Graham & Edwards (2001).

Biological traits analysis (BTA) were performed using three different numerical matrices: matrix “taxa by samples” that was built from dataset on taxa abundance in each sample; matrix “taxa by traits” performed from biological multi-trait of the taxa described above; and previous two were combined using a weighting procedure wherein trait category score for each taxon at a sample was multiplied by their abundance at each sample, creating a “traits by samples” matrix. We used the sum of replicates in each location for the biotic dataset on the multivariate analysis. Differences in each functional trait caused by variations in trait categories at different spatial and temporal scales were tested by a permutational multivariate analysis using PERMANOVA (Anderson et al. 2008). We used a simplified mixed model with two spatial factors orthogonal at two temporal factors: Sector (fixed; three levels; inner, intermediate and outer) and Tidal flats (random, three levels; nested in Sectors with 3 replicates); and Season (fixed; two levels; rainy and dry) and Fortnight (random; three levels; nested in Season). The test was performed using Euclidean distances, under 9999 permutations with a level of significance at $p < 0.05$, provided by a Monte Carlo asymptotic p-value. Variance components (VC%) were also estimated for each source of spatiotemporal variation. Principal Components Analysis (PCA) was carried out to explore trait composition variability along the estuarine gradient over time for each type of functional trait. PCA was performed with 81 samples for each season (rainy and dry) based on “trait by samples” matrix. Since the inner sector presented samples with huge species abundances in comparison to the others, we decided to construct the “trait by samples” matrix using a binary presence absence matrix (0s and 1s) instead a abundance matrix to remove the weight of the abundance of this sector on the ordinations. This procedure allowed for a better representation of the functional trait composition along the estuary gradient.

All statistical analyses and graphs, except PERMANOVA (Anderson et al. 2008), were carried out using R environment for statistical computing (R Development Core Team, 2015), with the packages “ade4” (Dray et al. 2015), “bpca” (Faria et al. 2013), “FD” (Laliberté et al. 2014), “GAD” (Sandrini-Neto & Camargo 2010), “sciplot” (Morales 2012) and “vegan” (Oksanen et al. 2013) .

3.3. RESULTS

Physicochemical variables

The relationship between ordination axes and physicochemical variables varied between seasons (Fig. 1). The first two components accounted for more than 55% of the total variability in both seasons. PCAs always discriminated three groups represented by estuarine sectors (inner, intermediate and outer). The intermediate and outer sectors often overlapped but were clearly separated from the inner sector. The estuarine gradient was more evident in dry season. The highest variability was visualized at small spatial and temporal scales (changes among Tidal flats and Locations at Fortnights).

Variability among sectors was mainly associated to grain size and the extent of the redox discontinuity layer in rainy season, while variations at smaller spatial and temporal scales were related to photosynthetic pigments, total organic carbon, phosphorus and calcium carbonate. All these variables were mostly correlated with the first axis. Marked differences along the estuarine gradient were strongly correlated with salinity and redox discontinuity layer along the first axis in dry season. However, grain size, pH, the freshness of organic matter, total organic carbon and N:P ratio also contributed to the variability of the samples at the largest or smallest scales related to the first axis. In addition, differences within the intermediate and outer sectors were also associated with phosphorus, chlorophyll-a, organic matter and calcium carbonate related to the second axis.

Salinity and pH had an entire linear gradient ranging from 0 to 34 and 6.23 to 7.8, respectively (Table 2). Grain size and redox discontinuity layer were higher in the inner sector than in the intermediate and outer sectors both in rainy and dry seasons (Table 2). The other physicochemical variables mainly varied at small spatial and temporal scales, indicating multiple small gradients changing over time (Fig. 1; Table 2).

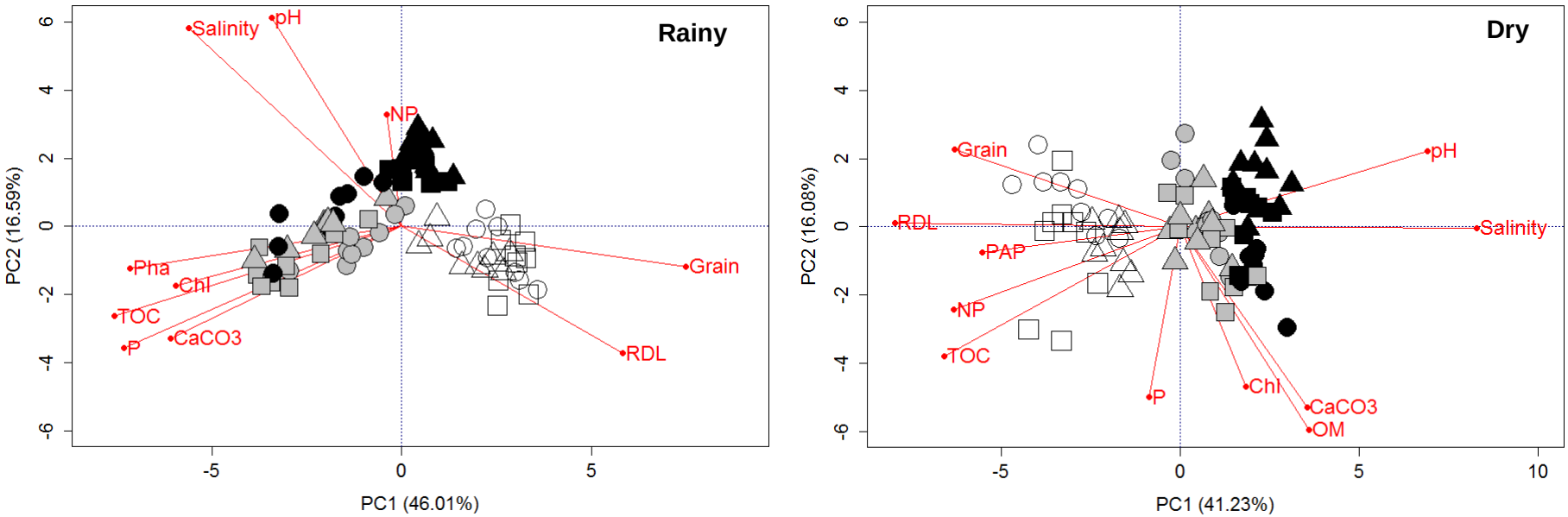

Fig. 1. Principal components analysis (PCA) depicting the variability of the physicochemical variables at different spatial and temporal scales along a subtropical estuarine system. Different sectors are represented by colors: *white* = Sector 1 (inner/upstream), *grey* = Sector 2 (intermediate) and *black* = Sector 3 (outer/downstream). Different tidal flats are represented by symbols (T1 = *circle*, T2 = *square* and T3 = *triangle*). RDL = redox discontinuity layer; P = phosphorus; TOC = total organic carbon; OM = Organic matter; Chl = chlorophyll-*a*; Pha = Phaeopigments; NP = N:P ratio; PAP = PAP ratio.

Table 2. Mean values (±SD) of the physicochemical variables along a subtropical estuarine system for each sector and season.

	Summer			Winter		
	S1	S2	S3	S1	S2	S3
Temperature (°C)	26.53 ± 1.49	27.27 ± 2.13	25.84 ± 0.71	22.65 ± 1.27	24.64 ± 1.97	23.61 ± 1.59
Salinity	8.33 ± 2.75	23.33 ± 4.31	31.48 ± 1.48	2.07 ± 2	18.93 ± 4.31	27.85 ± 2.89
pH	6.75 ± 0.29	6.99 ± 0.16	7.12 ± 0.17	6.75 ± 0.13	7.03 ± 0.17	7.27 ± 0.23
Chlorophyll-a ($\mu g.g^{-1}$)	9.42 ± 3.94	26.13 ± 15.39	16.06 ± 9.73	11.35 ± 6.18	9.27 ± 4.89	13.59 ± 6.99
Phaeopigments ($\mu g.g^{-1}$)	5.29 ± 4.77	17.5 ± 6.44	9.69 ± 5.76	7.6 ± 2.72	6.3 ± 3.16	3.52 ± 2.76
PAP ratio ($\mu g.g^{-1}$)	0.31 ± 0.22	0.44 ± 0.16	0.38 ± 0.18	0.42 ± 0.11	0.42 ± 0.15	0.19 ± 0.12
Total organic carbon (mg C/g dry weight)	5.6 ± 4.07	20.69 ± 9.75	11.91 ± 10.1	20.06 ± 8.67	11.6 ± 4.15	6 ± 3.85
Nitrogen (mg N/g dry weight)	0.56 ± 0.59	0.86 ± 0.41	0.94 ± 0.77	4.64 ± 3.5	0.56 ± 0.66	0.17 ± 0.23
Phosphorus (mg P/g dry weight)	1.15 ± 0.34	2.22 ± 0.54	1.4 ± 0.86	2.14 ± 0.73	2.2 ± 1.37	1.72 ± 1.07
N:P ratio (µmol/g dry weight)	0.97 ± 0.99	0.84 ± 0.32	1.52 ± 1.42	5.02 ± 3.18	0.97 ± 1.19	0.3 ± 0.41
C:N ratio (µmol/g dry weight)	8.41 ± 12.75	29.07 ± 12.43	17.04 ± 36.55	6.18 ± 2.76	21.56 ± 23.13	88.38 ± 191.73
Organic matter (%)	1.56 ± 1.43	8.55 ± 4.27	2.68 ± 3.28	1.74 ± 1.02	2.78 ± 1.28	2.54 ± 1.13
Calcium carbonate (%)	2.06 ± 0.95	7.15 ± 3	2.69 ± 2.79	2.06 ± 0.88	2.44 ± 0.87	2.98 ± 1.45
Redox discontinuity layer (cm)	9.94 ± 5.52	1.84 ± 0.94	1.87 ± 0.61	12.59 ± 3.33	1.21 ± 0.51	1.7 ± 0.55
Grain size (µm)	218.32 ± 76.99	69.4 ± 30.06	117.58 ± 40.01	197.46 ± 85.23	94.94 ± 12.67	113.32 ± 16.58

Functional changes in macrobenthic assemblages

Number of species (measured as number of taxa, including unidentified) and functional diversity displayed distinct variability patterns over space and time. There were strong significant interactions between space and time for both number of species and functional diversity (Table 3, Fig. 2). However, the relative importance (% VC) of individual factors and interactions was highly variable. A large amount of variation in number of species was concentrated at both residuals and interaction between Tidal flats and Fortnights, whereas for functional diversity the residuals and the largest spatial scale (Sectors) most contributed to the overall variance (Table 3).

Table 3. Summary of the analyses of variance ANOVA (MS = mean square, F-values and significant level) performed for number of species and functional diversity of macrofauna on the subtropical estuarine system. We considered the spatial factors (Sector, Tidal flats nested in Sector and Location nested in Tidal flats and Sector) orthogonal to temporal factors (Season and Fortnights nested in Season). VC% = variance component as percentages of the total. df = degrees of freedom, n = 3. Significant differences are shown with ***p<01; **p<0.01; *p<0.05; ns=not significant.

		Number of species			**Functional diversity**		
Source of variation	df	MS	F	VC%	MS	F	VC%
Season = Se	1	196.463	1.90	6.08	626.2	1.25	2.31
Sector = S	2	281.397	2.89	9.98	11648.1	6.18*	20.42
Fortnight (Se) = F (Se)	4	32.51	0.40	0.00	419.5	1.26	2.67
Tidal flats (S) = T(S)	6	36.444	0.59	0.00	1245.9	3.31**	10.83
Se x S	2	167.228	1.23	6.23	280.7	0.59	0.00
Location (T(S)) = L(T(S))	18	13.282	0.67	0.00	74.5	0.71	0.00
F(Se) x S	8	89.294	1.09	4.23	692.8	2.08	9.46
Se x T(S)	6	113.794	1.36	9.42	348	0.76	0.00
Se x L(T(S))	18	16.187	0.81	0.00	258.7	2.48**	10.74
F(Se) x T(S)	24	82.187	4.12***	21.66	333.4	3.19***	13.08
F(Se) x L(T(S))	72	19.944	1.27	9.73	104.4	1.49*	8.76
Residuals	324	15.759		32.69	70.2		21.73
Transformation		no			no		
Cochran's C test		**			***		

Functional diversity tends to increase from the inner to the outer sector while number of species was more uniform at the largest spatial scale over time (Fig. 2). Differences in number of species were significant among Tidal flats in inner and outer sectors during the rainy season and in intermediate and outer sectors during the dry season (SNK, p<0.05, Fig. 2). Differences in functional diversity were mostly significant among tidal flats in the outer sector in rainy season and in intermediate

and outer sectors in dry season (SNK, $p<0.001$, Fig. 2). These results suggest a high spatial variability at small spatial scales at short-time scales in the intermediate and outer sectors. However, there were no significant differences on benthic trait diversity for interactions between spatial and temporal small-scales in the inner sector (SNK, $p>0.05$, Fig.2).

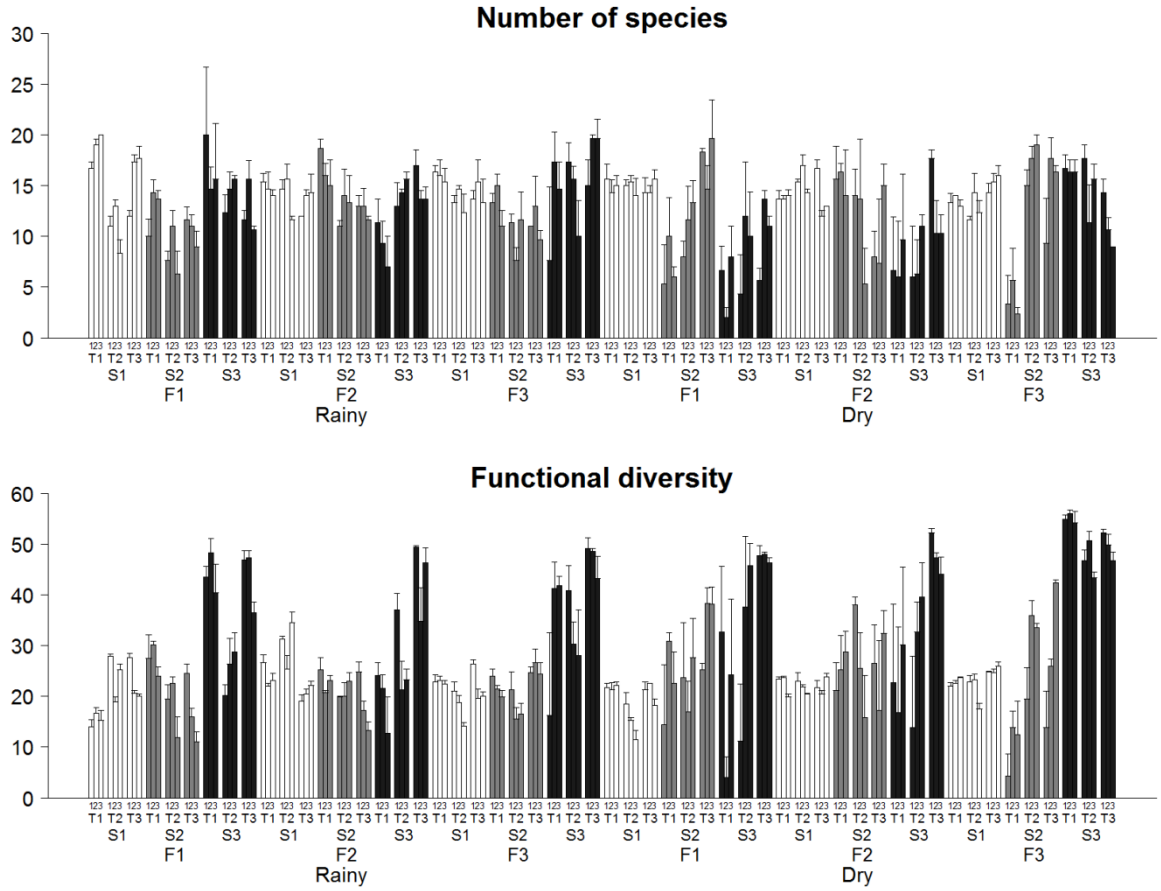

Fig. 2. Mean values (±SE) of number of species and functional diversity on benthic assemblage in the subtropical estuarine system for each season, fortnight (F1, F2 and F3), sectors (S1 = inner/upstream, S2 = intermediate and S3 = outer/downstream), tidal flats (T1, T2 and T3) and location (1, 2 and 3).

The BTAs of each trait category had a clear separation among sectors for both seasons and were also highly variable at small spatial and temporal scales (Figs. 3 and 4; Table 4). The largest spatial scale (Sectors) was the most relevant for total variance, except for the feeding mode whose residuals accounted for most of the total variability. A clear gradient could be observed from the inner to the outer sector in trait composition during the rainy season (Fig. 3). This pattern was not consistent in dry season when overlapping for all the trait categories were detected between the intermediate and the outer sectors (Fig. 4).

Table 4. Summary of multivariate analyses of variance (PERMANOVA) based on the Euclidean distance performed for each functional trait on the subtropical estuarine system. We considered the spatial factors (Sector, Tidal flats nested in Sector and Location nested in Tidal flats and Sector) orthogonal to temporal factors (Season and Fortnights nested in Season). VC% = variance component as percentages of the total. df = degrees of freedom, n = 3 replicates, 9999 permutations. p-values calculated through the Monte Carlo permutation test. Significant differences are shown with ***p<01; **p<0.01; *p<0.05.

		Bioturbation			**Depth**			**Size**		
Source of variation	df	MS	*Pseudo-F*	%VC	MS	*Pseudo-F*	%VC	MS	*Pseudo-F*	%VC
Season = Se	1	31.75	1.505	0.79	47.02	2.501	2.44	43.62	2.156	1.94
Sector = S	2	734.76	21.836***	50.23	521.67	24.396***	52.42	614.56	32.295***	58.23
Fortnight (Se) = F (Se)	4	15.83	0.841	0	11.88	0.943	0	11.25	0.865	0
Tidal flats (S) = T(S)	6	13.50	0.717	0	6.22	0.493	0	5.03	0.387	0
Se x S	2	117.45	3.5131*	13.62	55.84	2.476*	8.35	42.40	1.883	4.98
Se x T(S)	6	17.78	0.944	0	11.96	0.949	0	15.02	1.155	1.16
F(Se) x S	8	21.01	1.116	0.91	15.68	1.244	1.89	14.40	1.108	0.80
F(Se) x T(S)	24	18.83	3.716***	17.30	12.61	3.271***	16.12	13.00	3.417***	15.85
Residuals	108	5.07		19.11	3.85		21.29	3.80		19.67
Total	161									

		Feeding			**Movement**			**Mobility**		
Source of variation	df	MS	*Pseudo-F*	%VC	MS	*Pseudo-F*	%VC	MS	*Pseudo-F*	%VC
Season = Se	1	47.81	2.133	3.12	77.80	3.082	3.91	53.81	2.588	2.62
Sector = S	2	163.48	6.851***	21.32	485.18	18.022***	43.12	559.51	22.687***	49.38
Fortnight (Se) = F (Se)	4	16.38	1.065	0.28	16.76	0.942	0	14.54	0.821	0
Tidal flats (S) = T(S)	6	8.39	0.545	0	8.55	0.481	0	8.33	0.470	0
Se x S	2	72.67	2.843*	15.94	73.63	2.720*	10.49	54.99	2.407*	7.61
Se x T(S)	6	13.25	0.861	0	14.25	0.801	0	13.09	0.739	0
F(Se) x S	8	17.72	1.152	1.95	19.36	1.088	0.86	17.11	0.966	0
F(Se) x T(S)	24	15.39	3.300***	26.95	17.79	3.380***	20.46	17.72	3.217***	19.67
Residuals	108	4.66		35.15	5.26		25.79	5.51		26.62
Total	161									

		Body design			Development		
Source of variation	df	MS	*Pseudo-F*	%VC	MS	*Pseudo-F*	%VC
Season = Se	1	80.16	2.724	1.98	57.29	1.685	1.23
Sector = S	2	1343.80	35.001***	62.96	1040.30	25.060***	53.49
Fortnight (Se) = F (Se)	4	12.53	0.673	0	22.68	0.757	0
Tidal flats (S) = T(S)	6	19.32	1.037	0.10	5.62	0.188	0
Se x S	2	101.10	2.762*	7.27	96.10	1.905	6.23
Se x T(S)	6	23.74	1.275	1.46	29.09	0.972	0
F(Se) x S	8	19.61	1.053	0.28	37.09	1.239	2.23
F(Se) x T(S)	24	18.63	3.015***	10.66	29.94	4.130***	21.26
Residuals	108	6.18		15.87	7.25		20.38
Total	161						

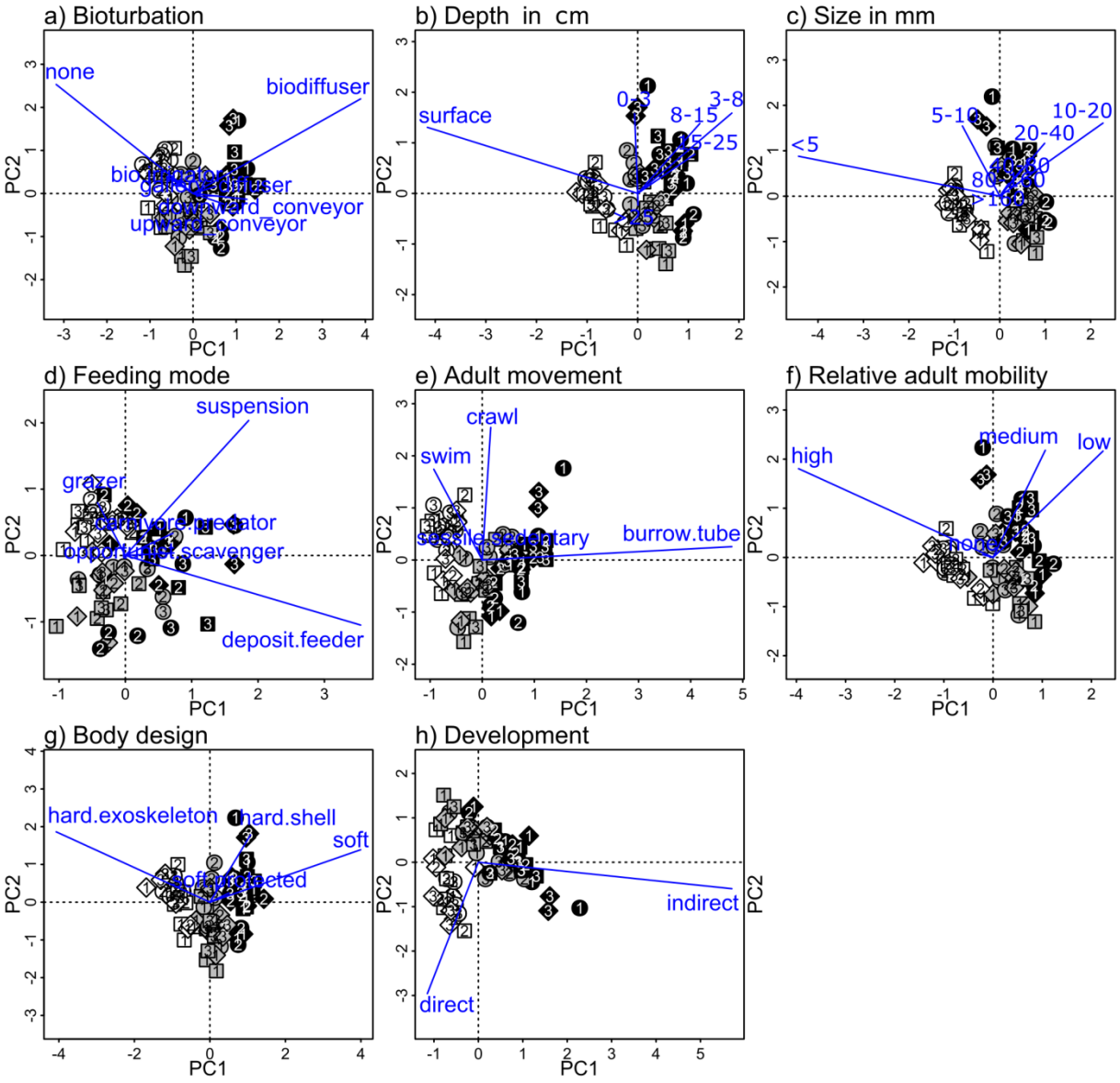

Fig. 3. PCA ordinations of each biological trait categories depicting the macrofaunal functional trait variability along sectors, tidal flats and fortnights during rainy season (March-April 2012). Different sectors are represented by colors (*white* = Sector 1, *grey* = Sector 2 and *black* = Sector 3) and tidal flats by symbols (T1 = *circle*, T2 = *square* and T3 = *diamond*). Numbers indicate fortnights.

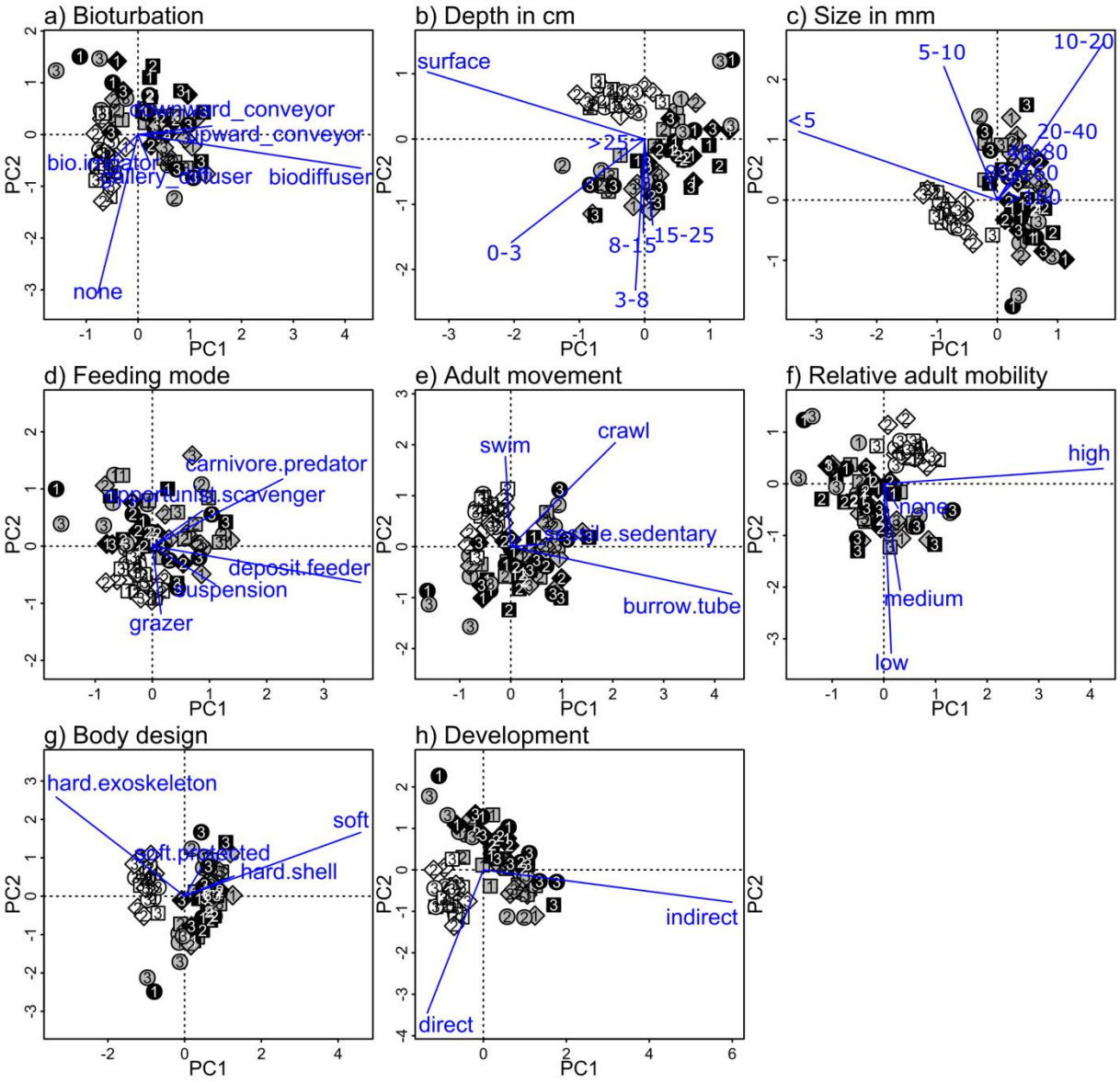

Fig. 4. PCA ordinations of each biological trait categories depicting the macrofaunal functional trait variability along sectors, tidal flats and fortnights during dry season (October-November 2012). Different sectors are represented by colors (*white* = Sector 1, *grey* = Sector 2 and *black* = Sector 3) and tidal flats by symbols (T1 = *circle*, T2 = *square* and T3 = *diamond*). Numbers indicate fortnights.

Both in rainy and dry seasons, the inner sector was characterized by taxa with a limited capacity for bioturbation (epifauna), very small size (< 5 mm), grazers, high mobility, big dispersion capacity (swimmers), hard exoskeleton and direct development. The outer sector was characterized by biodifusers, with high burrowing capacity, larger body size (> 10 mm), burrowers and tube-dwellers, slow to medium mobility, soft body and indirect development. This sector also present change in feeding mode between seasons, with a predominance of suspension and deposit feeders in rainy season, carnivore/predators and deposit feeders in dry season.

Assemblages from the intermediate sector were always associated with the center of the ordinations and were less associated with specific traits.

3.4. DISCUSSION

The hypothesis that the functional trait diversity of macrobenthic assemblages would be mainly driven by the largest spatial scales was not refuted. The greatest variability in the functional diversity index was detected at the largest spatial scale (sectors), with a clear distinction of functional trait composition among previously selected sectors. Such variability in functional trait diversity was congruent with the main estuarine gradient of salinity, pH, redox discontinuity layer and grain size. Similar studies also highlighted the salinity gradient as a permanent physiological stress to estuarine species, and as such a major driver of spatial and temporal variations in macrobenthic functional trait diversity along estuarine gradient (van der Linden et al. 2012, Veríssimo et al. 2012, Darr et al. 2014, Törnroos et al. 2015). However, variations in functional diversity at small scales, expressed by a less consistent spatial pattern mainly in dry season, indicate that variability within sectors can be also driven or regulated by short-term temporal variation. These results are largely congruent with those described for the taxonomic structure in Chapter 2.

Although Botta-Dukát (2005) showed that Rao's index may decrease with an increasing number of species, this pattern is not universal (Mouchet et al. 2010, Laliberté & Legendre 2010). In our case, variability patterns in functional diversity did not follow variability in number of species along the estuarine gradient. The higher functional diversity in the outer sector was indicative of a more variety of biological traits on benthic assemblage, lower functional redundancy, and thus a higher potential to modulate ecosystem functioning. Our findings contrast with previous abundance-based studies, which did not find significant spatial changes in functional diversity along the salinity gradient of temperate estuaries (van der Linden et al. 2012, Darr et al. 2014). van der Linden have find significant spatial differences only in winter. Only Törnroos et al. (2015) described variation trends along the salinity gradient in the Baltic Sea which are similar to ours.

Trait composition and variability along the three sectors indicate that spatial patterns in the functional trait diversity are consistent over time. Segregation on benthic functional groups along different estuarine sectors is already known for temperate estuaries (van der Linden 2012; Veríssimo et al. 2012). Trait variability at

the small temporal and spatial scales also followed the estuarine gradient, mainly between intermediate and outer sectors. Otherwise functional uniformity underlies the common benthic trait diversity within inner sector. Coarser bottoms in the inner sector are probably a result of higher hydrodynamics associated with tidal currents and river runoff (Marone et al. 2006). Tidal and riverine hydrodynamics affect local sedimentation rates and microphytobenthic productivity, and thus may limit the development of populations of deposit feeders (MacIntyre 1996, Jumars et al 2015). Little variation in trait composition in the inner sector was primarily caused by the numerical dominance of common crustacean species, such as the amphipod *Monocorophium acherusicum*, the tanaids *Monokalliapseudes schubarti* and *Sinelobus stanfordi*, the isopods *Cassidinidea fluminensis* and *Uromunna* cf. *peterseni*, and an unidentified ostracod. All these species display a limited bioturbation capacity, small size, high mobility, large dispersion capacity and a hard exoskeleton. The predominance of such trait combinations may be a response to natural (i.e., low salinity) or human-induced (i.e., high nutrient input) changes or a combined effect of both. Functional similarity among taxa in the inner sector over time may express their ability in performing similar functions (Bremner 2008). The proportion of k-strategists, average organism size and lifespan tend to decrease in stressed environments (Elliott & Quintino 2007). Although there is available evidence of contaminant input (such as pesticides, phosphorus, mercury) in the inner sector of Guaratuba Bay (Sanders et al. 2008, Combi et al. 2013, Cotovicz Junior et al. 2014), we were unable to establish any cause-effect relationships.

Changes in the functional diversity and composition along the Guaratuba estuary gradient suggest that ecosystem processes potentially modulated by the benthic macrofauna, such as nutrient cycling, could coincide with the salinity gradient. Functional traits such as bioturbation type, sediment penetration depth, organism size, movement type and relative mobility may directly affect sediment nutrient cycling (indeed, body size and mobility are included in the calculus of the Bioturbation Potential index; Birchenough et al. 2012). However, the relevance of given functional traits in modulating ecosystem processes vary along environmental gradients. For instance, bioturbator animals can affect nutrient exchange rates through the sediment-water interface in muddy bottoms (Reise 2002), but their relative importance may decrease as the sand fraction sediment increases (Mermillod-Blondin & Rosenberg 2006, Mermillod-Blondin 2011). Therefore, we

suggest that macrofaunal relevance as biogeochemical modifiers of the substrate decreases towards the inner sector of Guaratuba Bay.

In contrast, major driver factors at the largest spatial scale are unlikely to explain the small-scale variations in functional diversity and changes in overlapping traits within the intermediate and outer sectors, mainly between seasons. Assemblages from the intermediate and outer sectors displayed a diversity of trait categories, with varying strategies in feeding and bioturbation mode, burrowing capacity, body size and design, infaunal dwellings, with slow to medium mobility and indirect development. In this context, many functional categories may overlap, and a same species may belong to more than one functional group (Reise 2002). Large body size, deep-dwelling fauna, deposit feeders, filter feeders, scavenger, sedentary, tubes and burrows are trait categories identified as important for vertical (trophic transfer) and horizontal carbon cycling process (Bremner 2008) that were more important at small-scales.

Differences in trait composition at small scales suggest that niche changes in functional space may be a macrofaunal response to short-time changes in abiotic conditions, as displayed by the intermediate and outer sectors. However, a clear understanding of small-scale variation along estuarine gradients has not emerged as yet from the literature (van der Linden et al. 2012, Veríssimo et al. 2012, Darr et al., 2014, Törnroos et al. 2015), making it difficult to generalize or carry out comparisons of different estuarine systems. Macrobenthic assemblages may vary at a hierarchy of different spatial and temporal scales, even interactive variability (Morrissey et al. 1992, Chapman 2002, Ysebaert & Herman 2002). The resulting patchy distribution of a variety of biological traits can directly influence functional trait diversity. In this context, it is difficult to make predictions about the effect of constant environmental changes over time in estuaries. This pattern appears, therefore, to be affected by the idiosyncratic hypothesis (Johnson 1996).

Our results indicate that the analysis of macrobenthic functional diversity together with taxonomic-based approaches may provide better tools for management purposes. Number of species or taxonomic composition alone cannot provide a complete or integrated picture of benthic responses to environmental gradients. The complimentary use of a trait-based approach represents a sensible way to assess variability in assemblage structure and functions in space and time. For instance, the lower functional redundancy in the outer sector suggests an increased likelihood of

loss in potential functions with the local removal of species. Thus, progressive loss of functional redundancy downstream makes the high-energy euhaline sector a preferential target for management efforts.

Also, results indicate that the preservation of taxonomic and functional diversity, as well as the protection of functionally relevant species, may proof essential to maintain ecosystem functioning in future management efforts. The higher sensitivity of the functional trait diversity to minor taxonomical changes is also known for other ecological systems (Villéger et al. 2010, Gerisch et al. 2012, Mouillot et al. 2013). Our findings stress the potential of functional approaches as a basis for more consistent and reliable impact assessments. Future tests of how specific traits may affect estuarine properties may help to develop better predictive models of the relationships between biodiversity and ecosystem functioning.

3.5. CONCLUSIONS

We showed how the functional trait diversity of intertidal macrofauna varied along a subtropical estuarine gradient at different spatial and temporal scales. Functional properties, expressed by variability in functional diversity and functional trait composition along the estuarine gradient, were not primarily related to variations in number of species. This pattern further indicates the sensitivity of the functional approach in detecting minor or less evident variations in assemblage structure. Although we were unable to assess how individual drivers affect trait distribution, variations in functional diversity and composition were clearly congruent with the major gradient of salinity, pH, redox discontinuity layer and grain size over time. However, significant variations at small-scales also stressed the relative importance of changes in photosynthetic pigments, total organic carbon, organic matter and phosphorus at short spatial and temporal scales.

To build a better framework of the relationships between estuarine gradients and macrobenthic functional trait diversity, future studies should: (1) include multi-trait functional approaches in estuarine system; (2) assess spatial and temporal variability in functional diversity and functional composition using multiple-scale analysis; (3) test biological traits responses to environmental conditions and predict effect of habitat perturbations on estuarine macrobenthic assemblages.

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SUPPLEMENTARY MATERIAL

Table S1. Matrix “taxa by traits” for macrobenthic assemblages sampled on the subtropical estuarine system during rainy (March-April 2012) and dry (October-November 2012) seasons. Categories were coded by letters following increasing order according description from Table 1.

	Bioturbation						Depth (cm)						Body size (mm)					
Taxa	A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F
Gammaridea sp.3	3	0	0	0	0	0	1.5	1.5	0	0	0	0	2	1	0	0	0	0
Corophiidae sp.1	0	1.5	1.5	0	0	0	1.5	1.5	0	0	0	0	1.5	1.5	0	0	0	0
Gammaridea sp.1	3	0	0	0	0	0	1.5	1.5	0	0	0	0	1.5	1.5	0	0	0	0
Monocorophium acherusicum	0	1.5	1.5	0	0	0	1.5	1.5	0	0	0	0	1.5	1.5	0	0	0	0
Senticaudata sp.1	3	0	0	0	0	0	1.5	1.5	0	0	0	0	1.5	1.5	0	0	0	0
Anomalocardia flexuosa	0	3	0	0	0	0	0	0	0.5	2	0.5	0	0.5	1	1	0.5	0	0
Phacoides pectinatus	0	3	0	0	0	0	0	1	2	0	0	0	1.5	1.5	0	0	0	0
Macoma constricta	0	3	0	0	0	0	0	1	1	1	0	0	0	0	1.5	1.5	0	0
Macoma tenta	0	3	0	0	0	0	0	1	1	1	0	0	2	1	0	0	0	0
Mytella guayanensis	3	0	0	0	0	0	3	0	0	0	0	0	2	1	0	0	0	0
Tagelus cf. *plebeius*	0	3	0	0	0	0	0	1	1	1	0	0	1.5	1	0.5	0	0	0
Tagelus divisus	0	3	0	0	0	0	0	1	1	1	0	0	1.5	1	0.5	0	0	0
Tellina cf. *versicolor*	0	3	0	0	0	0	0	1	1	1	0	0	0	0.5	2	0.5	0	0
Tellina sp.1	0	3	0	0	0	0	0	1	1	1	0	0	2	1	0	0	0	0
Brachyura Megalopa	3	0	0	0	0	0	3	0	0	0	0	0	1.5	1.5	0	0	0	0
Callinectes sp.1 (juvenile)	0	2.5	0	0.5	0	0	0	0.5	0.5	1	1	0	1	2	0	0	0	0
Uca thayeri	0	0	3	0	0	0	0	0	0	0	0.5	2.5	0	1	2	0	0	0
Panopeidae_sp.1	0	1	1	1	0	0	1	1	1	0	0	0	0.5	2	0.5	0	0	0
Alpheus sp.1	0	0	3	0	0	0	0.5	0.5	0.5	0.5	0.5	0.5	0	0	1	1	1	0
Edwardisiidae sp.1	3	0	0	0	0	0	1.5	1.5	0	0	0	0	1	1	1	0	0	0
Cnidaria – simple Polyp sp.1	3	0	0	0	0	0	3	0	0	0	0	0	3	0	0	0	0	0

Cnidaria – branched Polyp sp.1	3	0	0	0	0	0	3	0	0	0	0	0	0	1.5	1.5	0	0	0
Harpacticoida sp.1	3	0	0	0	0	0	3	0	0	0	0	0	3	0	0	0	0	0
Harpacticoida sp.2	3	0	0	0	0	0	3	0	0	0	0	0	3	0	0	0	0	0
Cumacea sp.1	3	0	0	0	0	0	3	0	0	0	0	0	2.5	0.5	0	0	0	0
Bulla sp.1	0	3	0	0	0	0	1	2	0	0	0	0	1.5	1.5	0	0	0	0
Heleobia australis	3	0	0	0	0	0	2.5	0.5	0	0	0	0	2.5	0.5	0	0	0	0
Solariorbis shumoi	0	3	0	0	0	0	1.5	1.5	0	0	0	0	3	0	0	0	0	0
Hirudinea sp.1	3	0	0	0	0	0	3	0	0	0	0	0	1.5	1.5	0	0	0	0
Trichoptera sp.1	0	0	0	0	3	0	3	0	0	0	0	0	1.5	1.5	0	0	0	0
Ceratopogonidae sp.1	3	0	0	0	0	0	3	0	0	0	0	0	3	0	0	0	0	0
Chironomidae sp.1	3	0	0	0	0	0	1.5	1.5	0	0	0	0	1.5	1.5	0	0	0	0
pupae of Diptera	3	0	0	0	0	0	1.5	1.5	0	0	0	0	1.5	1.5	0	0	0	0
Insect larva sp.1	3	0	0	0	0	0	1.5	1.5	0	0	0	0	1.5	1.5	0	0	0	0
Cassidinidea fluminensis	1.5	1.5	0	0	0	0	2.5	0.5	0	0	0	0.5	3	0	0	0	0	0
Uromunna cf. *peterseni*	1.5	1.5	0	0	0	0	2.5	0.5	0	0	0	0.5	3	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	1.5	1.5	0	0	0	0	2.5	0.5	0	0	0	0.5	3	0	0	0	0	0
Nemertea sp.1	0	3	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	0
Nemertea sp.2	0	3	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	0
Oligochaeta	0	3	0	0	0	0	0	2	1	0	0	0	1.5	1	0.5	0	0	0
Ostracoda	3	0	0	0	0	0	3	0	0	0	0	0	3	0	0	0	0	0
Phoronis sp.1	0	0	0	0	3	0	0	1	1	1	0	0	1	1	1	0	0	0
Plathelminthes sp.1	3	0	0	0	0	0	3	0	0	0	0	0	1.5	1.5	0	0	0	0
Alitta succinea	0	1	2	0	0	0	0	0	0	1.5	1.5	0	0	0	0.5	0.5	1	1
Aricidea cf. *albatrossae, Aricidea cf. fragilis, Aricidea sp.*	0	1	2	0	0	0	0	0	0	1.5	1.5	0	0	0	0	0.5	1	1
Armandia hossfeldi	0	3	0	0	0	0	0	1.5	1.5	0	0	0	0	2	0.5	0.5	0	0
Boccardiella cf. *truncata*	0	1.5	1.5	0	0	0	0	0	1	1	1	0	0	3	0	0	0	0
Capitella cf. *capitata*	0	0	0	3	0	0	0	1.5	1.5	0	0	0	0	0.5	2	0.5	0	0
Dipolydora socialis	0	0	0	1.5	1.5	0	1	2	0	0	0	0	0	3	0	0	0	0

Exogone sp.1	0	3	0	0	0	0	2	1	0	0	0	0	3	0	0	0	0	0
Glycinde multidens	0	3	0	0	0	0	0.5	1	1.5	0	0	0	0	1	0.5	1	0.5	0
Heteromastus cf. *similis*	0	0	0	2	0	1	0	0	0	0	3	0	0	0.5	2	0.5	0	0
Isolda pulchella	0	0	0	0	3	0	0	1.5	1.5	0	0	0	0	0.5	2.5	0	0	0
Laeonereis pandoensis	0	3	0	0	0	0	0	2	1	0	0	0	0	0.5	0.5	1	0.5	0.5
Hermundura tricuspis	0	3	0	0	0	0	0	0	1	1	1	0	0	0.5	0.5	1.5	0.5	0
Lumbrineridae sp.1	0	3	0	0	0	0	0	0	0	1.5	1.5	0	0	1.5	1.5	0	0	0
Magelona papillicornis	0	0	3	0	0	0	0	1	1	1	0	0	0	0.5	1	1	0.5	0
Mediomastus sp.1	0	0	0	2	0	1	0	0	0	0	3	0	0	0.5	2	0.5	0	0
Nephtys fluviatilis	0	3	0	0	0	0	0	0.5	1.5	1	0	0	0	0.5	1	1	0.5	0
Nereis sp.1	0	3	0	0	0	0	0	1	1	1	0	0	0	0.5	1	1	0.5	0
Oxydromus sp.1	0	3	0	0	0	0	1.5	1.5	0	0	0	0	0.5	1	1.5	0	0	0
Phyllodoce pettiboneae	0	2	1	0	0	0	0.5	0.5	0.5	0.5	0.5	0.5	0	1.5	1.5	0	0	0
Prionospio multibranchiata	0	0	0	0	3	0	0	2	1	0	0	0	0	1	2	0	0	0
Scoloplos cf. *rubra*	0	3	0	0	0	0	0	0.5	1.5	1	0	0	0	0	0	1	1	1
Sigambra grubii	0	3	0	0	0	0	0	2	1	0	0	0	0	0.5	2	0.5	0	0
Spiophanes missionensis	0	0	0	0	3	0	0	1	1	1	0	0	0	1	1	1	0	0
Streblospio cf. *benedicti*	0	0	0	1.5	1.5	0	0	3	0	0	0	0	0	3	0	0	0	0
Monokalliapseudes schubarti	0	0	0.5	0	0	2.5	0.5	2.5	0	0	0	0	0	0.5	2	0.5	0	0
Sinelobus stanfordi	0	0	0.5	0	0	2.5	0.5	2.5	0	0	0	0	2	1	0	0	0	0

Table S1 continued

Taxa	Feeding mode					Adult movement				Relative adult mobility				Body design				Development	
	A	B	C	D	E	A	B	C	D	A	B	C	D	A	B	C	D	A	B
Gammaridea sp.3	2	1	0	0	0	0	0.5	2	0.5	0	0	0	3	0	0	3	0	0	3
Corophiidae sp.1	2	1	0	0	0	0	0	1	2	0	0	1.5	1.5	0	0	3	0	0	3
Gammaridea sp.1	2	1	0	0	0	0	0.5	2	0.5	0	0	0	3	0	0	3	0	0	3
Monocorophium acherusicum	2	1	0	0	0	0	0	1	2	0	0	1.5	1.5	0	1.5	1.5	0	0	3
Senticaudata sp.1	2	1	0	0	0	0	0	3	0	0	0	0	3	0	0	3	0	0	3
Anomalocardia flexuosa	0	3	0	0	0	0	0	0	3	0	1.5	1.5	0	0	0	0	3	3	0
Phacoides pectinatus	0	3	0	0	0	2	0	0	1	0	2	1	0	0	0	0	3	3	0
Macoma constricta	1.5	1.5	0	0	0	0	0	0	3	0	2	1	0	0	0	0	3	3	0
Macoma tenta	1.5	1.5	0	0	0	0	0	0	3	0	2	1	0	0	0	0	3	3	0
Mytella guayanensis	0	3	0	0	0	3	0	0	0	3	0	0	0	0	0	0	3	3	0
Tagelus cf. *plebeius*	3	0	0	0	0	0	0	1	2	0	1	2	0	0	0	0	3	3	0
Tagelus divisus	3	0	0	0	0	0	0	1	2	0	1	2	0	0	0	0	3	3	0
Tellina cf. *versicolor*	1.5	1.5	0	0	0	0	0	0	3	0	2	1	0	0	0	0	3	3	0
Tellina sp.1	1.5	1.5	0	0	0	0	0	0	3	0	2	1	0	0	0	0	3	3	0
Brachyura Megalopa	0	0	0	0	0	0	1.5	1.5	0	0	0	0	3	0	0	3	0	3	0
Callinectes sp.1 (juvenile)	0	0	1.5	0	1.5	0	1.5	1.5	0	0	0	0	3	0	0	3	0	3	0
Uca thayeri	3	0	0	0	0	0	0	1.5	1.5	0	0	0	3	0	0	3	0	3	0
Panopeidae_sp.1	0	0	0	0	0	0	0	1.5	1.5	0	0	0	3	0	0	3	0	3	0
Alpheus sp.1	0	0	0.5	0	2.5	0	0.5	1.25	1.25	0	0	0	3	0	0	3	0	3	0
Edwardisiidae sp.1	0	0	0	0	3	3	0	0	0	1.5	1.5	0	0	3	0	0	0	1.5	1.5
Cnidaria – simple Polyp sp.1	0	0	0	0	3	3	0	0	0	1.5	1.5	0	0	3	0	0	0	1.5	1.5
Cnidaria – branched Polyp sp.1	0	0	0	0	3	3	0	0	0	1.5	1.5	0	0	3	0	0	0	1.5	1.5
Harpacticoida sp.1	1.5	0	0	0	1.5	0	3	0	0	0	0	0	3	0	0	3	0	3	0
Harpacticoida sp.2	1.5	0	0	0	1.5	0	3	0	0	0	0	0	3	0	0	3	0	3	0
Cumacea sp.1	0	3	0	0	0	0	3	0	0	0	0	0	3	0	0	3	0	3	0

Bulla sp.1	0	0	1	1	1	0	0	3	0	0	0	1	2	0	0	0	3	3	0
Heleobia australis	3	0	0	0	0	0	1.5	1.5	0	0	0	0	3	0	0	0	3	3	0
Solariorbis shumoi	0	0	0	0	3	0	0	3	0	0	0	1	2	0	0	0	3	3	0
Hirudinea sp.1	0	0	1	0	2	0	1.5	1.5	0	0	0	1.5	1.5	3	0	0	0	0	3
Trichoptera sp.1	0	1	0	0	2	0	1.5	1.5	0	0	0	0	3	0	1.5	1.5	0	3	0
Ceratopogonidae sp.1	0	0	0	0	3	0	1	1	1	0	0	1.5	1.5	0	1	2	0	3	0
Chironomidae sp.1	1.5	0	0	0	1.5	0	0	3	0	0	3	0	0	0	1	2	0	3	0
pupae of Diptera	0	0	0	0	3	0	0	3	0	0	0	0	3	0	1	2	0	3	0
Insect larva sp.1	0	0	0	0	3	0	0	3	0	0	0	0	3	0	1	2	0	3	0
Cassidinidea fluminensis	0	0	0	3	0	0	1.5	1.5	0	0	0	0	3	0	0	3	0	0	3
Uromunna cf. *peterseni*	0	0	0	3	0	0	1.5	1.5	0	0	0	0	3	0	0	3	0	0	3
Pseudosphaeroma cf. *jakobii*	0	0	0	3	0	0	1.5	1.5	0	0	0	0	3	0	0	3	0	0	3
Nemertea sp.1	0	0	1.5	0	1.5	0	0	3	0	0	0	3	0	3	0	0	0	1.5	1.5
Nemertea sp.2	0	0	1.5	0	1.5	0	0	3	0	0	0	3	0	3	0	0	0	1.5	1.5
Oligochaeta	1.5	0	0	1.5	0	0	0	1	2	0	1.5	1.5	0	3	0	0	0	0	3
Ostracoda	0	3	0	0	0	0	3	0	0	0	0	0	3	0	0	1.5	1.5	0	3
Phoronis sp.1	0	3	0	0	0	1	0	0	2	0	3	0	0	0	3	0	0	1.5	1.5
Plathelminthes sp.1	0	0	1.5	0	1.5	0	0	3	0	0	0	0	3	3	0	0	0	1.5	1.5
Alitta succinea	1.5	0.5	0.5	0	0.5	0	1.5	0	1.5	0	1.5	1.5	0	3	0	0	0	3	0
Aricidea cf. *albatrossae, Aricidea cf. fragilis, Aricidea sp.*	1.5	0.5	0.5	0	0.5	0	1.5	0	1.5	0	1.5	1.5	0	3	0	0	0	3	0
Armandia hossfeldi	3	0	0	0	0	0	0	3	0	0	0	1	2	3	0	0	0	3	0
Boccardiella cf. *truncata*	3	0	0	0	0	0	0	1	2	0	0.5	1	1.5	1.5	1.5	0	0	1.5	1.5
Capitella cf. *capitata*	2.5	0	0	0.5	0	0	0	0	3	0	3	0	0	1.5	1.5	0	0	1.5	1.5
Dipolydora socialis	1	1	0	1	0	1	0	0	2	2	1	0	0	1.5	1.5	0	0	1.5	1.5
Exogone sp.1	1	0	1	0	1	0	0	3	0	0	0	0	3	3	0	0	0	1.5	1.5
Glycinde multidens	0	0	0	0	3	0	0	3	0	0	0	0	3	3	0	0	0	1.5	1.5
Heteromastus cf. *similis*	3	0	0	0	0	0	0	0	3	0	3	0	0	3	0	0	0	1.5	1.5
Isolda pulchella	3	0	0	0	0	0	0	0	3	0	3	0	0	0	3	0	0	3	0

Laeonereis pandoensis	3	0	0	0	0	0	0	2.5	0.5	0	0	0	3	1.5	1.5	0	0	0	3
Hermundura tricuspis	1	1	1	0	0	0	0	1	2	0	0	0.5	2.5	3	0	0	0	3	0
Lumbrineridae sp.1	1	0	1	0	1	0	0.5	1.25	1.25	0	0	0	3	3	0	0	0	3	0
Magelona papillicornis	1.5	1.5	0	0	0	0	0	1.5	1.5	0	0	1.5	1.5	3	0	0	0	3	0
Mediomastus sp.1	3	0	0	0	0	0	0	0	3	0	3	0	0	3	0	0	0	1.5	1.5
Nephtys fluviatilis	0	0	0	0	3	0	1.5	1.5	0	0	0	1	2	3	0	0	0	3	0
Nereis sp.1	1	0	1	0.5	0.5	0	0	1	2	0	0	1	2	3	0	0	0	3	0
Oxydromus sp.1	0	0	0	0	3	0	0	3	0	0	0	0	3	3	0	0	0	3	0
Phyllodoce pettiboneae	0.5	0	1	0	1.5	0	0	2	1	0	0	0	3	3	0	0	0	3	0
Prionospio multibranchiata	3	0	0	0	0	0	0	0	3	0	0	2	1	0	3	0	0	1.5	1.5
Scoloplos cf. *rubra*	3	0	0	0	0	0	0	0	3	0	0	3	0	3	0	0	0	3	0
Sigambra grubii	0	0	0.5	0	2.5	0	0	3	0	0	0	0	3	3	0	0	0	3	0
Spiophanes missionensis	1.5	1.5	0	0	0	0	0	0	3	0	3	0	0	0	3	0	0	1.5	1.5
Streblospio cf. *benedicti*	1.5	0.5	0	1	0	0	0	0	3	1	2	0	0	1.5	1.5	0	0	1.5	1.5
Monokalliapseudes schubarti	0	3	0	0	0	0	1	1	1	0	0	0	3	0	1	2	0	0	3
Sinelobus stanfordi	1.5	0	0	0	1.5	0	1	1	1	0	0	0	3	0	0.5	2.5	0	0	3

Conclusões Gerais

General conclusions based on the findings of the studies presented in this thesis

Conclusões gerais baseadas nos resultados dos capítulos apresentados nesta Tese

Conclusões gerais

Nesta pesquisa foi possível identificar quais as principais forçantes que governam os padrões de variabilidade da macrofauna bêntica ao longo de um gradiente estuarino subtropical. A abordagem apenas hierarquizada no espaço como também a de modelo misto e complexo hierarquizado no espaço e no tempo indicaram que as assembleias macrobênticas estão fortemente estruturadas na maior escala espacial do gradiente estuarino. A variação na maior escala foi evidente para os atributos taxonômicos (abundancia total, abundancia da maioria dos táxons numericamente dominantes e composição das assembleias) e funcionais (diversidade funcional e composição dos traços funcionais). Este gradiente na maior escala espacial foi mais relacionado com a salinidade, pH, tamanho médio do grão e profundidade da camada de descontinuidade redox.

O padrão espacial de distribuição dos organismos bênticos na maior escala foi comum a vários outros sistemas estuarinos em diferentes regiões do mundo. Este resultado indica que os filtros ambientais derivados destas forçantes limitam as condições e são determinantes para a distribuição das espécies e consequentemente dos traços funcionais. No entanto, a novidade deste trabalho está relacionada com as variações nas menores escalas espaciais e temporais. Embora as mudanças temporais não afetem o padrão geral de estruturação das assembleias entre os setores estuarinos, existiram variações nas menores escalas espaciais (desde centenas de metros a metros) e temporais (entre quinzenas). A distribuição em forma de manchas que variam no espaço e no tempo é uma característica inerente dos organismos bênticos frequentemente registrada para diversos habitats marinhos. No entanto, ela não é diagnosticada para outros sistemas estuarinos provavelmente porque os delineamentos de amostragem utilizados com maior frequência (linear, grid ou pontos aleatórios) não incorporam a replicação em múltiplas escalas.

A variabilidade nas menores escalas, principalmente na escala de centenas de metros (baixios), nas interações entre baixios e quinzenas ou no resíduo, foi mais evidente para a riqueza de táxons, abundancia de alguns táxons dominantes (os poliquetas *Aricidea* spp., *Streblospio* cf. *benedicti*, *Capitella* sp. e *Heteromastus* cf. *similis*, oligoqueta não identificado, e o gastropoda *Heleobia australis*) e para o traço “modo de alimentação”. A riqueza de táxons não variou significativamente entre os

setores e esse padrão foi consistente ao longo do tempo. Esse padrão difere de todos os modelos empíricos ou conceituais de diversidade estuarina encontrados na literatura. O resultado desta pesquisa incentiva uma crítica para a revisão destes modelos que não devem ser generalizados para todos os grupos de organismos no estuário. Além disso, as análises de composição taxonômica e funcional indicaram mudanças nas menores escalas espaciais e temporais, com sobreposição entre os setores intermediário e externo, principalmente no inverno. Essa variabilidade ocorreu principalmente por mudanças na quantidade e qualidade da matéria orgânica, nitrogênio, razão entre nitrogênio e fósforo, razão entre carbono e nitrogênio, carbonato de cálcio, que variaram também nas menores escalas de espaço e/ou de tempo.

Nesse contexto, enfatizamos a importância da inclusão de múltiplas escalas nos delineamentos de amostragem ao longo de um gradiente estuarino, com replicação em menores escalas espaciais e temporais. Portanto, os monitoramentos pontuais atendendo as exigências das atividades de avaliação e licenciamento, ou mesmo com uma grande série de dados temporais anuais não são completamente confiáveis. A distribuição das espécies macrobênticas também não pode ser resumida apenas com um determinado descritor tradicional, baseado nas espécies, ou moderno, baseado nos traços biológicos das espécies. A estrutura das assembleias engloba muitos componentes que são complementares entre si e devem ser avaliados em conjunto. Não devemos apenas medir variáveis reconhecidamente relacionadas com o gradiente de salinidade. A estrutura das assembleias no estuário é um resultado da combinação de diferentes fatores atuando em várias escalas de espaço e tempo.

Portanto, recomendamos a utilização de amostragens em múltiplas escalas espaciais e temporais para avaliar os atributos taxonômicos e funcionais da macrofauna em gradientes estuarinos. A abordagem em múltiplas escalas pode contribuir para ampliar o conhecimento científico nestes ambientes e oferecer suporte para estudos macroecológicos. A identificação das escalas e a definição das forçantes predominantes em cada uma delas também são essenciais para estabelecer estratégias na avaliação e monitoramento ambiental do estuário, principalmente em eventos imprevisíveis e localizados. Se a variabilidade em cada escala não for avaliada, será mais difícil fazer previsões futuras para mitigação dos efeitos das mudanças ambientais no estuário.

ANEXOS

Anexo A. Matriz de dados das variáveis ambientais coletadas em março de 2012 na Baía de Guaratuba utilizada nas análises do Capitulo 1. Temp = temperatura (°C), RDL = camada de descontinuidade redox (cm), Sal = salinidade, Chl = clorofila-a ($\mu g.g^{-1}$), Feo = feopigmentos ($\mu g.g^{-1}$), COT = carbono orgânico total (mg C/g dry weight), M.O. = matéria orgânica (%), $CaCO_3$ = carbonato de cálcio (%), Grain = tamanho médio do grão (µm), Feochl = razão PAP ($\mu g.g^{-1}$), N/P = razão N:P (µmol/g dry weight), C/N = razão C:N (µmol/g dry weight).

Amostra	Temp	RDL	Sal	pH	Chl	Feo	COT	N	P	M.O.	$CaCO_3$	Grain	Feochl	N/P	C/N
1	27,8	6,60	8	6,34	8,89	1,19	0,75	0	1,079	7,22	3,29	168,1	0,12	0	0
2	27,5	13,10	8	6,23	4,17	9,11	2,17	0	1,613	4,31	1,05	142,9	0,69	0	0
3	28,4	18,03	9	6,45	9,25	0,00	2,06	0	0,752	0,73	3,68	182	0,00	0	0
4	27,4	17,00	6	6,34	5,38	0,00	0	0	0,520	0,69	1,05	314,4	0,00	0	0
5	27,4	6,23	4	6,82	4,41	0,00	0	0	0,616	1,48	4,33	320,7	0,00	0	0
6	27,3	8,16	10	6,48	1,97	0,42	1,51	0	0,628	0,83	1,64	393,1	0,18	0	0
7	28,9	2,30	6	6,38	9,50	3,41	4,16	0	0,835	0,8	1,42	299,3	0,26	0	0
8	30,9	14,90	5	6,71	14,68	10,53	11,23	1,5554	1,219	1,34	3,1	445,3	0,42	2,825	8,426
9	29,1	21,50	5	6,64	10,74	2,67	11,73	1,5457	1,374	1,09	1,34	334	0,20	2,491	8,851
10	27,9	8,20	5	6,67	2,09	10,26	5,94	0	0,878	0,75	2,66	270,8	0,83	0	0
11	27,8	8,03	5	6,74	13,48	3,67	9,50	0	1,326	1,92	1,03	211,7	0,21	0	0
12	26,6	6,97	5	6,83	12,88	5,31	9,56	0	1,219	1,2	3,66	165,9	0,29	0	0
13	29,3	2,83	26	7,01	44,71	12,14	29,43	2,021	2,609	1,01	7,63	34,27	0,21	1,715	16,988
14	30,3	2,27	24	7,07	51,26	13,49	23,68	1,662	2,177	9,5	1,63	72,75	0,21	1,690	16,626
15	30,3	1,47	25	7,11	36,60	27,00	32,86	1,475	2,601	9,43	9,89	59,62	0,42	1,256	25,997
16	30,6	2,03	25	7,27	46,78	20,60	28,01	1,318	2,948	6,97	7,64	38,74	0,31	0,990	24,806
17	29,8	2,40	24	7,02	37,96	23,60	35,22	1,055	3,021	8,03	8,04	38,84	0,38	0,773	38,946
18	31,5	3,23	23	6,94	29,65	18,64	26,73	1,065	2,312	7,49	5,59	77,5	0,39	1,020	29,278
19	29,3	3,97	22	6,83	45,56	8,85	14,06	0,452	1,541	6,3	5,15	75,67	0,16	0,649	36,287
20	29,9	2,90	22	6,82	46,59	29,89	19,34	0,805	2,375	5,95	5,53	39,29	0,39	0,751	28,020
21	29,9	4,23	22	6,78	36,78	8,01	20,36	1,052	2,501	5,55	5,78	81,97	0,18	0,931	22,582
22	28	2,13	23	7,04	51,67	25,90	30,77	1,123	2,613	7,7	8,52	109,5	0,33	0,952	31,963

Anexo A. Continuação...

Amostra	Temp	RDL	Sal	pH	Chl	Feo	COT	N	P	M.O.	$CaCO_3$	Grain	Feochl	N/P	C/N
23	29,1	2,53	21	6,91	34,32	17,26	23,57	0,815	2,063	0,72	0,58	100,9	0,33	0,875	33,726
24	29,8	1,90	21	6,98	33,83	15,47	17,96	0,676	1,888	0,7	1,06	108,1	0,31	0,793	30,993
25	26,4	1,67	30	6,96	13,23	0,00	5,49	0	0,740	0,56	0,93	135,7	0,00	0	0
26	26,3	2,20	31	7,35	13,39	10,19	9,35	0,056	1,291	1,12	1,07	135,4	0,43	0,096	195,003
27	26,3	2,33	30	7,45	17,59	0,93	5,70	0	0,971	1,49	2,67	127,1	0,05	0	0
28	26,6	1,70	32	7,43	12,88	3,91	6,00	0	0,792	0,93	1,35	127,3	0,23	0	0
29	26,9	1,90	34	7,13	14,68	5,01	3,79	0	0,779	0,65	2,46	150,2	0,25	0	0
30	27	2,83	34	6,94	10,95	1,03	3,99	0	0,717	4,1	0,8	155,6	0,09	0	0
31	26,4	2,03	31	6,93	36,98	16,49	16,51	1,168	1,647	1,68	5,22	80,05	0,31	1,570	16,488
32	27,1	1,20	31	6,86	42,60	13,39	19,08	1,017	1,669	6,12	6,56	106,2	0,24	1,349	21,888
33	27	0,57	29	7,22	37,08	16,71	11,33	0,414	1,304	4,32	4,12	96,75	0,31	0,702	31,967
34	29,3	1,30	28	7,09	37,03	12,97	16,66	0,653	2,031	0,58	12,84	197,7	0,26	0,712	29,755
35	30,1	0,70	26	7,11	30,68	16,18	32,49	1,078	3,049	2,03	3,11	180,4	0,35	0,783	35,157
36	29,6	1,80	28	7,05	57,09	7,70	25,43	0,997	2,389	5,01	5,98	153,1	0,12	0,924	29,764

Anexo B. Matriz de dados da macrofauna bêntica coletada em março de 2012 na Baía de Guaratuba que foram utilizados para as análises do Capitulo 1.

Taxa / Amostras	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
Corophiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	2	1	5	20	60	10	0	0	1	0	0	0	0	0	0	1	1	0
Senticaudata sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lucina pectinata	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Macoma tenta	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1
Mytella guayanensis	3	5	3	4	3	10	0	0	0	4	0	1	0	0	0	0	0	0
Pitar cf. *fulminata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus divisus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma constricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	2	0	0	1	2	5	1	1	0	0	0	0	0	0	0	1	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panopeidae_sp.1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alpheus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0

Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulla sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	0	0	1	1	1	0	0	1	0	6	0	0	0	0	0	0	0	0
Neritina virginea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hirudinea sp.1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	76	214	160	758	1194	1030	15	8	3	7	3	2	1	2	2	0	2	0
Heteroptera	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sciomyzidae	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
pupae of Diptera	4	6	2	4	1	0	0	1	0	0	0	0	0	0	0	0	0	0
Acari	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	2	3	0	0	0	8	11	12	2	17	17	7	6	10	24	8	6
Nemertea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	0
Oligochaeta	63	28	28	11	34	27	0	0	50	37	5	38	135	50	24	124	63	6
Ostracoda	273	231	256	92	224	306	110	211	113	26	28	19	52	32	6	60	34	33
Monokalliapseudes schubarti	94	85	125	100	113	121	131	163	230	37	24	48	1	0	1	0	1	3
Sinelobus stanfordi	3	0	6	26	31	43	0	1	0	0	0	0	0	0	0	0	0	0
Aricidea cf. albatrossae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Aricidea cf. fragilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Capitella cf. *capitata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitellidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diopatra sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heteromastus cf. *similis*	0	0	1	0	0	0	1	2	0	0	0	1	0	2	0	0	0	0
Isolda pulchella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis culveri	0	0	0	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0
Leiocapitellides sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Nephtys fluviatilis	29	34	30	37	36	38	22	11	25	16	25	17	1	10	2	5	0	4
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes missionensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sigambra grubii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alitta succinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo B. Continuação...

Taxa / Amostras	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Corophiidae	0	0	0	0	0	1	1	0	2	0	0	0	9	4	4	2	3	4
Gammaridea sp.1	0	0	0	15	15	14	3	3	7	1	13	24	90	49	69	9	15	4
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	73	8	42	1329	1736	1336	1404	1432	1564	1259	2244	1873	2247	1168	1855	1685	1638	1305
Senticaudata sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lucina pectinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma tenta	5	8	1	18	25	27	9	15	12	1	5	7	4	3	5	6	2	3
Mytella guayanensis	6	7	9	55	63	51	11	21	27	22	51	44	63	25	45	28	37	39
Pitar cf. *fulminata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus divisus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma constricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	0	0	0	1	4	3	0	3	3	2	1	5	8	2	1	1	5	5
Callinectes sp.1 (juvenile)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	3	2
Uca thayeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panopeidae_sp.1	0	0	0	1	3	3	0	1	7	0	2	0	3	3	4	1	1	0
Alpheus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	1	6	3	4	6	5	3	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	18

Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulla sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	4	3	0	35	76	34	36	76	14	0	1	0	1	1	0	1	1	1
Neritina virginea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	6	10	7	6	3	6	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	1	1	0	0	2	1	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	384	424	228	503	491	384	420	544	372	46	119	182	201	157	172	165	131	116
Heteroptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sciomyzidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	7	1	5	14	12	3	1	11	5	2	6	7	7	4	0	8	4	3
Acari	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	1	7	4	7	1	3	4	0	8	5	10	4	14	5	7	5
Uromunna cf. *peterseni*	1	0	1	2	6	1	1	1	2	3	6	10	20	19	15	2	3	10
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Oligochaeta	0	1	11	0	0	0	6	2	7	4	0	5	0	2	1	2	2	2
Ostracoda	357	237	180	468	491	168	396	284	416	46	335	344	381	249	341	51	323	219
Monokalliapseudes schubarti	196	197	173	99	82	100	71	184	276	74	36	112	145	222	112	75	281	77
Sinelobus stanfordi	11	4	10	433	604	496	368	440	436	109	273	309	132	70	140	148	131	158
Aricidea cf. albatrossae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aricidea cf. fragilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitellidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diopatra sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heteromastus cf. *similis*	0	1	0	0	0	0	0	0	0	5	7	1	0	4	1	2	2	1
Isolda pulchella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis culveri	0	0	1	0	0	0	0	0	1	0	1	0	0	1	2	2	0	4
Leiocapitellides sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	4	17	21	22	5	8	20	8	30	32	46	32	67	42	39	15	31	50
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes missionensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Sigambra grubii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alitta succinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo B. Continuação...

Taxa / Amostras	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**
Corophiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senticaudata sp.1	0	1	1	0	0	2	0	0	0	0	2	0	0	0	4	0	0	0
Anomalocardia flexuosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lucina pectinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	1	3	1	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0
Pitar cf. *fulminata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus divisus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma constricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	1	0	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	0	0	1	3	4	4	2	2	6	4	2	2	0	3	0
Panopeidae_sp.1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Alpheus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Edwardisiidae sp.1	2	0	0	0	0	0	2	0	0	0	0	0	9	0	1	7	2	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Bulla sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	7	1	5	3	8	2	2	0	0	0	0	0	2	0	2	0	0	0
Neritina virginea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	5	0	0	0	1	1	0	0	1	0	0	0	2	0	0
Chironomidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heteroptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sciomyzidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acari	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea sp.1	0	0	0	0	2	0	1	1	0	0	0	0	0	0	0	0	0	0
Oligochaeta	47	4	74	186	78	78	449	552	131	11	7	4	63	40	23	377	62	2
Ostracoda	4	3	0	1	2	0	2	0	0	0	0	1	0	1	1	0	0	0
Monokalliapseudes schubarti	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Sinelobus stanfordi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aricidea cf. albatrossae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aricidea cf. fragilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	4	3	3	2	5	6	22	14	4	0	1	0	3	3	2	5	2	0
Capitellidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diopatra sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heteromastus cf. *similis*	9	5	22	6	8	22	3	1	4	4	11	13	10	8	15	8	4	0
Isolda pulchella	1	0	0	0	0	0	2	0	0	0	0	1	0	1	0	1	0	0
Laeonereis culveri	74	29	56	170	188	141	112	100	68	69	90	68	63	80	85	118	50	11
Leiocapitellides sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	17	16	9	7	11	16	3	6	7	10	24	46	31	30	18	13	21	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes missionensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	0	0	3	1	0	2	10	0	0	1	0	0	0	0	2	1	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sigambra grubii	1	1	4	0	0	1	0	0	0	0	3	0	1	1	0	0	1	0
Alitta succinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo B. Continuação...

Taxa / Amostras	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Corophiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	6	21	11	6	2	2	2	0	1
Monocorophium acherusicum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senticaudata sp.1	0	0	0	1	4	0	4	0	0	14	29	11	21	11	15	25	1	4
Anomalocardia flexuosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lucina pectinata	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	10	4	2	10	14	29	15	5	13	20	18	14	4	19	8	3	6	8
Pitar cf. *fulminata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0
Tagelus divisus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina cf. *versicolor*	0	0	0	1	0	1	1	0	2	1	1	1	1	4	1	1	1	1
Tellina sp.1	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Macoma constricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	5	1	1	1	4	5	8	3	2	1	0	0	0	0	0	0	0	0
Panopeidae_sp.1	0	0	0	0	1	0	0	0	0	4	3	0	0	1	1	0	0	1
Alpheus sp.1	0	0	0	1	0	0	1	0	0	0	1	0	1	0	0	1	0	0
Edwardisiidae sp.1	3	0	6	21	16	34	0	3	4	2	0	2	7	2	2	2	3	4
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Cnidaria	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Phoronis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulla sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	1	1	18	40	7	54	12	0	1	6	3	5	11	25	13	30	10	6
Neritina virginea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
Heteroptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sciomyzidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acari	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea sp.1	0	0	0	0	3	0	1	0	3	0	1	0	1	2	2	1	0	1
Oligochaeta	244	8	16	27	92	92	132	137	68	7	14	9	29	5	10	8	7	9
Ostracoda	6	0	9	11	7	19	5	1	0	80	62	102	103	124	79	108	79	71
Monokalliapseudes schubarti	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Sinelobus stanfordi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aricidea cf. albatrossae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aricidea cf. fragilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	5	0	5	5	19	4	5	16	6	2	1	2	7	3	15	9	1	4
Capitellidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diopatra sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heteromastus cf. *similis*	8	0	1	1	2	2	1	5	0	10	24	31	23	24	20	13	18	23
Isolda pulchella	0	0	0	0	0	0	1	0	1	0	0	0	2	2	0	0	0	0
Laeonereis culveri	49	8	9	44	72	112	58	91	50	26	15	32	51	104	36	56	46	67
Leiocapitellides sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	41	3	5	36	32	30	21	28	18	54	78	56	42	51	34	48	35	43
Nereis sp.1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Odontosyllis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes missionensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	1	0	0	1	6	1	0	0	0	5	8	4	11	3	2	0	0	9
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sigambra grubii	1	1	0	1	1	0	0	7	2	5	6	2	3	1	2	3	3	0
Alitta succinea	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo B. Continuação...

Taxa / Amostras	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**86**	**87**	**88**	**89**	**90**
Corophiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senticaudata sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	1	1	1	1	3	0	1	1	2	10	8	5	16	16	28	9	17	13
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lucina pectinata	3	0	0	2	1	0	0	2	2	0	0	0	0	0	1	0	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	0	0	0	0	0	1	0	0	0	3	1	0	2	2	2	0	0	0
Pitar cf. *fulminata*	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Tagelus cf. *plebeius*	4	0	2	2	3	1	0	1	0	0	0	0	0	0	0	0	0	0
Tagelus divisus	0	0	0	0	0	0	0	0	0	2	1	1	9	7	4	2	8	2
Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Tellina sp.1	0	0	0	0	1	2	3	0	0	0	3	5	2	9	4	7	18	8
Macoma constricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Uca thayeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panopeidae_sp.1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
Alpheus sp.1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	3	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0
Bulla sp.1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Heleobia australis	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0
Neritina virginea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heteroptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sciomyzidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acari	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea sp.1	0	0	1	1	2	0	1	1	1	0	0	0	1	2	1	1	0	0
Oligochaeta	11	1	3	6	14	11	8	9	14	5	12	5	0	0	0	0	0	0
Ostracoda	1	0	0	0	2	0	1	0	0	0	0	0	1	1	0	3	0	1
Monokalliapseudes schubarti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sinelobus stanfordi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aricidea cf. albatrossae	224	128	135	193	132	179	185	123	205	54	26	45	38	45	36	3	9	10
Aricidea cf. fragilis	0	0	0	0	0	0	1	10	3	0	2	0	0	0	0	0	0	0

Armandia hossfeldi	3	2	7	2	1	6	1	16	13	2	1	5	0	1	3	0	0	0
Capitella cf. *capitata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Capitellidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diopatra sp.	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	1	0	0	0	1	0	1	0	0	0	1	0	2	3	2	1	0	1
Heteromastus cf. *similis*	0	0	0	0	0	0	0	5	0	2	0	3	2	3	0	0	2	0
Isolda pulchella	1	1	0	1	2	0	0	0	1	0	0	0	1	0	1	0	0	0
Laeonereis culveri	3	0	1	2	3	3	4	3	4	1	0	0	0	0	1	1	0	0
Leiocapitellides sp.	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Hermundura tricuspis	1	2	2	0	1	0	3	1	2	1	1	2	1	0	1	0	0	1
Magelona papillicornis	1	0	1	0	1	3	1	4	2	1	0	13	1	6	2	3	4	2
Mediomastus sp.1	7	3	4	4	12	9	8	5	5	12	4	0	16	0	6	5	7	4
Nephtys fluviatilis	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
Spiophanes missionensis	0	0	2	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0
Streblospio cf. *benedicti*	0	0	2	0	1	2	1	0	0	4	1	0	0	0	3	0	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sigambra grubii	0	2	0	3	1	1	2	3	3	2	1	6	0	1	2	0	0	1
Alitta succinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada littorea	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

Anexo B. Continuação...

Taxa / Amostras	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**100**	**101**	**102**	**103**	**104**	**105**	**106**	**107**	**108**
Corophiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Senticaudata sp.1	6	0	1	0	0	0	0	1	1	0	0	0	1	5	0	3	0	6
Anomalocardia flexuosa	1	0	1	0	0	2	0	1	0	2	3	1	0	0	0	0	1	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Lucina pectinata	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	1	0	0	0	0	1	0	1	1	9	11	13	7	5	3	2	7	1
Pitar cf. *fulminata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Tagelus divisus	5	2	6	9	3	6	1	9	6	0	7	3	0	1	0	0	0	2
Tellina cf. *versicolor*	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	1	0	1	0	0	0	0	2	0	1	0	1	0	0	0	0	0	0
Macoma constricta	0	0	0	0	0	1	0	0	0	2	2	2	1	6	1	5	4	1
Brachyura juvenil	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0
Uca thayeri	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Panopeidae_sp.1	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	3
Alpheus sp.1	3	1	1	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0
Edwardisiidae sp.1	0	0	0	0	0	0	0	0	0	4	1	0	1	3	0	1	1	4
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Bulla sp.1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	3	0	4	0	0	0	0	0	0	48	102	77	34	4	11	4	7	15
Neritina virginea	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Solariorbis shumoi	5	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0
Heteroptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sciomyzidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	2	0	0	0	0	0	0	0	0	0	0	0	4	0	0	1	2	0
Acari	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea sp.1	2	2	4	0	0	0	1	1	1	0	0	0	0	3	0	0	0	1
Oligochaeta	6	1	3	2	1	6	0	1	3	0	0	0	1	3	0	0	0	0
Ostracoda	6	6	3	1	2	3	0	1	2	3	1	1	1	0	0	0	0	1
Monokalliapseudes schubarti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sinelobus stanfordi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aricidea cf. albatrossae	22	0	10	20	17	37	0	5	26	0	0	0	1	1	0	0	3	1
Aricidea cf. fragilis	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	4	0	1	2	0	2	0	4	2	35	0	0	179	125	78	15	74	77
Capitellidae	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Diopatra sp.	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	1	1	0	0	5	1	0	1	1	1	0	2	1	0	1	0	0	1
Heteromastus cf. *similis*	16	3	11	12	5	11	0	15	12	4	0	0	20	15	0	1	0	5
Isolda pulchella	1	0	0	3	2	0	0	1	2	5	2	0	4	1	0	2	2	2
Laeonereis culveri	1	0	0	2	0	4	0	3	1	44	21	12	77	68	11	14	12	18
Leiocapitellides sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	5	0	0	4	1	3	0	1	2	1	1	0	1	0	0	1	2	1
Magelona papillicornis	1	0	1	0	3	0	0	1	0	0	0	0	0	1	0	0	0	1
Mediomastus sp.1	22	0	10	3	2	10	0	4	2	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	2	0	6	1	3	5	0	2	2	3	1	2	8	11	6	5	4	2
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes missionensis	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	72	1	20	53	13	57	0	21	40	0	0	0	36	69	2	0	1	15
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sigambra grubii	4	0	3	0	1	1	0	3	2	1	1	3	6	3	3	1	2	9
Alitta succinea	1	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	1	1
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	1	0	3	0	0	2	0	0	3	1	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo C. Matriz de dados das variáveis físico-geoquímicas coletadas no período chuvoso (março e abril) e no período seco (outubro e novembro) de 2012 na Baía de Guaratuba que foram utilizados para as análises do Capitulo 2 e 3. Temp = temperatura (°C), RDL = camada de descontinuidade redox (cm), Sal = salinidade, Chl = clorofila-a ($\mu g.g^{-1}$), Feo = feopigmentos ($\mu g.g^{-1}$), COT = carbono orgânico total (mg C/g dry weight), M.O. = matéria orgânica (%), $CaCO_3$ = carbonato de cálcio (%), Grain = tamanho médio do grão (µm), Feochl = razão PAP ($\mu g.g^{-1}$), N/P = razão N:P (µmol/g dry weight), C/N = razão C:N (µmol/g dry weight).

Amostra	Temp	RDL	Sal	pH	Chl	Pha	PAP	COT	N	P	M.O.	CaCO3	Grain	N/P	C/N
1	28,9	2,30	6	6,38	9,50	3,41	0,26	4,16	0	0,835	0,8	1,42	299,3	0	0
2	30,9	14,90	5	6,71	14,68	10,53	0,42	11,23	1,555	1,219	1,34	3,1	445,3	2,825	8,426
3	29,1	21,50	5	6,64	10,74	2,67	0,20	11,73	1,546	1,374	1,09	1,34	334	2,491	8,851
4	27,8	6,60	8	6,34	8,89	1,19	0,12	0,75	0	1,079	7,22	3,29	168,1	0	0
5	27,5	13,10	8	6,23	4,17	9,11	0,69	2,17	0	1,613	4,31	1,05	142,9	0	0
6	28,4	18,03	9	6,45	9,25	0	0	2,06	0	0,752	0,73	3,68	182	0	0
7	27,9	8,20	5	6,67	2,09	10,26	0,83	5,94	0	0,878	0,75	2,66	270,8	0	0
8	27,8	8,03	5	6,74	13,48	3,67	0,21	9,50	0	1,326	1,92	1,03	211,7	0	0
9	26,6	6,97	5	6,83	12,88	5,31	0,29	9,56	0	1,219	1,2	3,66	165,9	0	0
10	29,3	3,97	22	6,83	45,56	8,85	0,16	14,06	0,452	1,541	6,3	5,15	75,67	0,649	36,287
11	29,9	2,90	22	6,82	46,59	29,89	0,39	19,34	0,805	2,375	5,95	5,53	39,29	0,751	28,020
12	29,9	4,23	22	6,78	36,78	8,01	0,18	20,36	1,052	2,501	5,55	5,78	81,97	0,931	22,582
13	30,6	2,03	25	7,27	46,78	20,60	0,31	28,01	1,318	2,948	6,97	7,64	38,74	0,990	24,806
14	29,8	2,40	24	7,02	37,96	23,60	0,38	35,22	1,055	3,021	8,03	8,04	38,84	0,773	38,946
15	31,5	3,23	23	6,94	29,65	18,64	0,39	26,73	1,065	2,312	7,49	5,59	77,5	1,020	29,278
16	29,3	2,83	26	7,01	44,71	12,14	0,21	29,43	2,021	2,609	1,01	7,63	34,27	1,715	16,988
17	30,3	2,27	24	7,07	51,26	13,49	0,21	23,68	1,662	2,177	9,5	1,63	72,75	1,690	16,626
18	30,3	1,47	25	7,11	36,60	27,00	0,42	32,86	1,475	2,601	9,43	9,89	59,62	1,256	25,997
19	26,4	2,03	31	6,93	36,98	16,49	0,31	16,51	1,168	1,647	1,68	5,22	80,05	1,570	16,488
20	27,1	1,20	31	6,86	42,60	13,39	0,24	19,08	1,017	1,669	6,12	6,56	106,2	1,349	21,888
21	27	0,57	29	7,22	37,08	16,71	0,31	11,33	0,414	1,304	4,32	4,12	96,75	0,702	31,967
22	26,4	1,67	30	6,96	13,23	0	0	5,49	0	0,740	0,56	0,93	135,7	0	0
23	26,3	2,20	31	7,35	13,39	10,19	0,43	9,35	0,056	1,291	1,12	1,07	135,4	0,096	195,003
24	26,3	2,33	30	7,45	17,59	0,93	0,05	5,70	0	0,971	1,49	2,67	127,1	0	0

Anexo C. Continuação...

Amostra	Temp	RDL	Sal	pH	Chl	Pha	PAP	COT	N	P	M.O.	CaCO3	Grain	N/P	C/N
25	26,6	1,70	32	7,43	12,88	3,91	0,23	6,00	0	0,792	0,93	1,35	127,3	0	0
26	26,9	1,90	34	7,13	14,68	5,01	0,25	3,79	0	0,779	0,65	2,46	150,2	0	0
27	27	2,83	34	6,94	10,95	1,03	0,09	3,99	0	0,717	4,1	0,8	155,6	0	0
28	25,4	8,60	5	7,5	12,23	0	0	2,98	0,061	0,969	0,54	2,43	215,7	0,140	56,642
29	25,3	11,03	6	6,96	15,49	2,19	0,12	7,10	0,518	1,197	1,13	2,61	91,88	0,958	15,998
30	25,6	15,60	7	7,05	12,74	9,01	0,41	9,98	0,552	1,427	0,91	0,55	245,7	0,856	21,099
31	25,5	2,83	10	6,64	2,30	0	0	1,63	0	0,591	1,08	2,15	303,9	0	0
32	25,7	5,33	9	6,5	8,33	0,77	0,09	2,98	0	0,748	3,09	2,01	264,8	0	0
33	25,4	8,13	10	6,61	6,85	0	0	2,22	0	0,626	1,68	2,64	218,8	0	0
34	25,9	8,60	7	6,83	9,08	2,30	0,20	5,90	0,225	1,499	1,89	1,08	230,5	0,333	30,540
35	26,6	7,77	7	6,72	8,24	2,72	0,25	4,63	0,302	1,120	0	0,51	257,6	0,597	17,878
36	26,5	8,03	7	6,63	14,76	4,19	0,22	9,36	0,521	1,340	1,56	1,08	183,6	0,861	20,946
37	25,9	1,50	20	6,91	22,10	10,52	0,32	17,42	0,959	1,851	19,55	10,78	86,08	1,147	21,197
38	25,8	0,90	8	7,33	10,02	10,92	0,52	16,61	0,633	1,593	8,99	9,46	136,8	0,880	30,602
39	26,1	1,07	12	7,07	18,87	12,00	0,39	15,86	0,438	1,676	10,45	11,38	66,12	0,578	42,267
40	26,4	2,37	28	6,63	43,58	22,71	0,34	29,87	0,734	2,477	6,86	7,77	98,58	0,656	47,501
41	26,8	1,80	27	6,72	49,53	21,94	0,31	29,59	0,944	2,220	6,7	10,16	57,7	0,941	36,586
42	26,6	1,13	21	7,02	24,84	12,20	0,33	37,21	1,052	3,415	6,61	5,64	19,71	0,682	41,288
43	25,8	0,93	24	7,15	17,41	17,38	0,50	25,41	0,968	2,123	7,24	6,19	75,6	1,010	30,619
44	25,6	0,97	26	7,14	15,42	15,43	0,50	25,04	0,516	1,681	11,43	8,7	83,58	0,679	56,619
45	25,6	1,47	26	7,05	9,64	10,70	0,53	18,79	0,667	1,734	0,61	0,52	86,03	0,852	32,855
46	25,5	1,30	33	6,76	3,24	6,42	0,66	41,07	2,474	4,192	14,6	10,34	24,32	1,307	19,370
47	25,8	2,50	34	7,02	8,88	17,38	0,66	29,37	1,838	3,314	9,67	10,81	44,5	1,228	18,639
48	25,7	1,43	33	7,18	23,28	23,88	0,51	33,28	1,952	3,213	0,66	0,56	35,67	1,346	19,885
49	25,9	1,67	31	7,09	12,71	8,58	0,40	9,29	0,797	1,713	0,53	0,99	136,2	1,030	13,596
50	25,9	2,03	31	7,2	10,95	9,67	0,47	6,23	0,842	0,942	1,18	1,62	131,7	1,979	8,636
51	25,9	2,00	31	7,24	13,58	13,14	0,49	11,24	0,976	1,362	1,41	2,12	133,7	1,587	13,430

Anexo C. Continuação...

Amostra	Temp	RDL	Sal	pH	Chl	Pha	PAP	COT	N	P	M.O.	CaCO3	Grain	N/P	C/N
52	25,9	3,23	34	7,27	11,29	11,70	0,51	9,80	0,829	1,141	0,7	0,98	145	1,609	13,795
53	25,8	1,23	32	7,3	5,57	10,74	0,66	6,23	0,553	0,889	1,18	1,2	166,1	1,377	13,143
54	25,8	2,10	33	7,01	7,79	12,89	0,62	5,82	0,554	0,853	0,38	0,44	156	1,440	12,250
55	25,5	6,13	8	6,76	9,82	6,58	0,40	0	1,291	1,078	0,51	1,46	260	2,652	0
56	25,5	14,63	11	7,07	12,59	15,76	0,56	10,28	1,163	1,634	1,22	1,3	226,4	1,576	10,307
57	25,5	24,00	9	7,31	5,48	7,51	0,58	5,40	1,373	1,354	1,48	1,63	59,53	2,246	4,591
58	25,5	14,77	13	6,5	3,88	1,85	0,32	1,18	0,659	0,873	0,65	2,1	214,4	1,671	2,085
59	25,5	11,67	14	6,87	5,02	2,73	0,35	2,20	0,475	0,748	0,18	1,4	221,5	1,407	5,409
60	25,5	8,17	11	6,55	5,20	2,32	0,31	0	0,658	0,739	1,74	3,28	167,1	1,972	0
61	25,5	5,17	11	7,12	12,87	10,69	0,45	4,60	1,449	1,642	1,61	3,07	183,9	1,955	3,702
62	25,5	4,23	13	6,69	10,84	14,20	0,57	14,06	1,448	1,655	1,7	2,31	134,4	1,938	11,325
63	25,5	4,10	11	6,9	12,81	13,73	0,52	9,54	1,199	1,625	1,8	2,9	194,8	1,634	9,286
64	26,5	1,97	24	6,84	8,60	21,67	0,72	0,92	0,429	1,458	1,43	0,6	82,87	0,651	2,499
65	26,5	2,27	25	6,99	7,07	12,70	0,64	0,28	0,333	1,542	13,76	8,03	100,5	0,479	0,994
66	26,5	1,77	24	6,98	6,17	15,38	0,71	10,98	0,469	2,077	12,47	10,16	59,6	0,500	27,286
67	25,5	0,97	26	6,98	11,40	14,61	0,56	7,60	0,366	1,759	9,4	7,15	78,22	0,460	24,237
68	25,4	1,23	23	6,82	25,08	29,16	0,54	32,63	0,948	3,383	9,71	7,09	33,52	0,621	40,161
69	25,4	1,00	26	7,15	10,24	17,54	0,63	17,16	0,537	2,235	13,4	10,49	130,1	0,533	37,262
70	24,7	0,93	25	7,11	22,55	27,61	0,55	12,33	1,015	2,383	6,3	3,93	99,64	0,943	14,167
71	25,1	1,23	26	6,98	19,49	22,95	0,54	17,72	0,717	2,172	9,61	7,16	27,08	0,731	28,839
72	25,2	0,97	26	7,12	7,65	14,87	0,66	13,59	0,521	1,971	16,15	10,86	33,36	0,585	30,424
73	25,1	1,00	31	7,15	23,39	13,78	0,37	15,84	1,609	1,398	3,45	3,46	123,7	2,548	11,491
74	25,1	1,27	31	7,06	22,63	16,00	0,41	21,65	1,654	1,548	6,91	5,34	93,24	2,365	15,278
75	25,1	1,07	29	6,96	14,45	13,07	0,47	19,61	1,740	1,448	0,5	0,56	114,2	2,661	13,151
76	25,3	2,27	31	6,99	21,52	6,47	0,23	0	0	0,983	0,56	0,44	129,3	0	0
77	25,1	1,97	32	7,25	14,23	5,59	0,28	0	0,058	1,084	1,56	2,1	142,6	0,118	0
78	25	1,97	30	7,12	14,83	8,26	0,36	0	1,855	1,197	2,84	0,55	108,2	3,433	0

Anexo C. Continuação...

Amostra	Temp	RDL	Sal	pH	Chl	Pha	PAP	COT	N	P	M.O.	CaCO3	Grain	N/P	C/N
79	25,3	2,13	31	7,24	11,45	6,68	0,37	11,51	1,686	0,990	2,35	2,77	159,2	3,773	7,965
80	24,8	2,73	30	7,13	7,89	5,17	0,40	9,93	1,626	0,838	1,73	1,7	166,6	4,296	7,123
81	24,7	2,27	31	7,03	6,67	4,58	0,41	9,51	1,580	0,676	1,28	1,34	50,19	5,172	7,026
82	21,8	10,27	3	6,8	18,87	8,55	0,31	12,45	7,183	1,707	1,06	2,42	195,1	9,320	2,022
83	21,8	13,43	5	6,9	18,31	8,00	0,30	14,17	4,242	1,411	1,31	2,84	131,4	6,656	3,895
84	21,5	17,57	4	6,9	17,10	5,83	0,25	12,45	4,084	1,441	0,99	2,09	126,1	6,275	3,557
85	21,3	15,33	6	6,9	11,38	6,43	0,36	34,78	15,898	2,319	4,21	4,22	153,5	15,181	2,552
86	21,1	12,73	5	6,6	10,89	11,86	0,52	42,10	15,049	2,936	3,28	3,44	200,9	11,348	3,263
87	21,2	13,90	4	6,8	11,10	6,70	0,38	25,38	7,241	2,274	2,74	3,48	120,3	7,051	4,090
88	21,6	8,03	5	6,8	15,64	7,24	0,32	10,26	3,774	1,462	1,5	2,87	206,3	5,715	3,171
89	21,6	5,63	5	6,7	30,92	14,21	0,31	22,28	7,179	2,128	2,14	1,62	123,6	7,469	3,622
90	21,6	7,50	5	6,9	17,35	9,84	0,36	18,59	5,932	1,882	2,43	3,56	142,5	6,979	3,655
91	22,5	0,83	24	7,3	6,44	5,70	0,47	10,73	0	4,071	3,02	1,68	98,37	0	0
92	22,8	2,63	23	7,3	14,34	7,00	0,33	12,73	0	4,441	4,1	2,22	104,6	0	0
93	23	2,03	23	7,2	10,13	7,93	0,44	10,73	0	4,091	3,2	2,53	96,13	0	0
94	22	0,90	24	7	17,43	9,13	0,34	10,67	0	4,057	3,84	2,52	66,76	0	0
95	21,9	0,77	24	6,8	17,41	9,08	0,34	12,49	0	4,393	4,36	3,15	84,29	0	0
96	22,1	0,93	24	6,9	18,57	12,21	0,40	16,02	0	4,582	2,74	2,62	76,16	0	0
97	21,6	1,00	25	6,7	6,08	7,96	0,57	16,23	1,814	1,251	2,16	3,06	105,2	3,210	10,439
98	21,7	1,10	23	6,9	9,14	7,80	0,46	12,74	0	3,130	1,54	2,6	95,46	0	0
99	21,5	1,07	24	6,8	12,76	2,94	0,19	8,08	0	3,146	4,68	2,22	106	0	0
100	21,6	2,40	30	6,9	17,65	3,99	0,18	8,53	0	4,022	2,96	3,5	103,3	0	0
101	21,7	2,07	30	7,2	18,38	9,44	0,34	5,19	0	3,752	3,07	2,8	74,74	0	0
102	21,7	1,73	30	7	21,92	4,41	0,17	5,28	0	2,880	3,19	5,04	119,1	0	0
103	21,8	1,57	31	7,2	13,49	5,30	0,28	7,10	0	3,336	2,88	1,96	103	0	0
104	21,8	1,10	30	7,1	18,54	8,70	0,32	9,58	0,086	4,051	3,33	2,64	111,7	0,047	129,347
105	21,5	1,17	31	7	10,16	8,26	0,45	5,23	0	2,688	3,18	5,83	122,4	0	0

Anexo C. Continuação...

Amostra	Temp	RDL	Sal	pH	Chl	Pha	PAP	COT	N	P	M.O.	CaCO3	Grain	N/P	C/N
106	21,5	1,30	33	7,6	11,72	0,45	0,04	5,19	0,010	2,948	2,06	2,74	125,7	0,007	635,975
107	21,5	1,40	32	6,9	10,50	2,45	0,19	2,46	0	1,580	0,92	2,52	130	0	0
108	21,1	1,00	32	7,5	4,85	0,03	0,01	1,02	0	0,885	2,15	4,28	123,1	0	0
109	24,6	14,97	1	6,6	6,47	5,39	0,45	14,94	1,612	1,055	2,07	0,76	173	3,383	10,812
110	24,8	19,07	2	6,8	7,55	6,51	0,46	11,77	1,876	1,179	0,3	1,04	372,1	3,522	7,321
111	24,8	14,77	2	6,8	13,40	5,11	0,28	12,50	3,478	1,327	1,55	1,15	372,3	5,804	4,193
112	24,1	14,60	1	7	5,97	4,98	0,45	31,71	4,472	1,950	2,07	1,88	274,9	5,077	8,272
113	24,2	12,43	0	6,8	6,25	6,87	0,52	37,67	4,202	1,993	1,52	1,56	200,4	4,668	10,457
114	24,1	10,87	0	6,8	9,62	6,79	0,41	29,57	2,946	1,737	1,68	1,41	268,6	3,756	11,710
115	24	9,03	0	6,6	16,60	6,18	0,27	10,90	3,170	1,462	1,94	2,23	154,2	4,802	4,012
116	24,1	9,43	0	6,6	8,60	7,47	0,46	18,60	3,829	1,804	4,21	1,74	188,4	4,698	5,668
117	24,2	6,97	0	6,8	17,64	11,75	0,40	19,95	3,858	1,880	2,76	2,33	135,2	4,544	6,033
118	26,2	1,10	15	7	5,47	4,74	0,46	3,74	0,070	0,819	0,65	0,12	89,72	0,191	61,951
119	27	1,00	12	7,2	6,28	7,50	0,54	3,94	2,333	1,341	1,27	0,66	116,7	3,852	1,970
120	27,3	1,10	17	6,9	8,25	5,26	0,39	4,38	1,816	1,481	0,33	2,28	105,5	2,715	2,816
121	25,4	2,07	17	7	4,92	4,49	0,48	14,82	0,284	0,903	1,23	3	92,47	0,695	60,974
122	25,3	1,50	17	6,8	3,68	8,05	0,69	12,19	0,206	0,554	3,02	4,11	119,4	0,822	69,209
123	25,7	1,07	15	6,8	6,18	4,60	0,43	11,62	0,602	0,353	2,63	1,22	106,5	3,781	22,513
124	24,6	2,53	18	7,1	6,36	3,09	0,33	9,08	0,843	0,719	4,61	1,58	107,8	2,596	12,573
125	24,5	1,10	22	7,1	5,60	6,18	0,52	7,42	0,409	0,798	1,95	1,81	91,7	1,135	21,161
126	24,5	1,53	19	7,1	5,68	11,92	0,68	17,56	0,322	1,293	3,05	1,93	97,94	0,552	63,517
127	23,8	1,77	23	7,2	23,71	4,36	0,16	3,77	0,395	1,439	0,18	2,5	107,1	0,607	11,135
128	24	2,03	24	7,2	17,70	6,40	0,27	5,71	0,260	1,560	2,8	0,91	95,61	0,369	25,639
129	24	1,33	26	7,1	16,41	5,60	0,25	5,82	0,041	1,268	5,77	7,53	112,7	0,072	164,775
130	24,1	2,03	25	7,2	7,64	3,65	0,32	2,51	0,468	1,124	3,16	1,55	116,2	0,922	6,258
131	24	1,30	28	7,1	7,13	4,13	0,37	4,36	0,193	0,982	2,48	3,05	114	0,435	26,421
132	23,9	1,80	28	7,3	12,36	1,25	0,09	0,52	0,321	0,919	2,73	4,04	124,7	0,774	1,878

Anexo C. Continuação...

Amostra	Temp	RDL	Sal	pH	Chl	Pha	PAP	COT	N	P	M.O.	CaCO3	Grain	N/P	C/N
133	23,8	1,67	27	7,2	9,56	0,89	0,09	2,05	0,304	1,322	2,14	0,77	130,3	0,510	7,853
134	23,8	1,60	29	7,2	10,21	0	0	0	0,077	1,292	1,24	2,18	145,2	0,133	0
135	23,8	0,77	26	7,5	3,31	0,78	0,19	0	0,020	1,033	3,69	1,63	118,7	0,042	0
136	22,3	14,13	1	6,6	6,62	8,63	0,57	14,81	2,679	2,788	1,05	1,69	137,6	2,127	6,452
137	22,3	16,03	1	6,6	5,18	6,65	0,56	17,28	2,293	2,541	0,55	1,23	279,8	1,998	8,791
138	22,6	12,40	1	6,6	4,46	7,23	0,62	20,68	4,478	3,698	0,45	1,04	420,2	2,681	5,388
139	22,1	14,77	1	6,9	5,78	7,03	0,55	20,09	3,853	3,445	1,54	2,03	230,3	2,468	8,004
140	21,6	14,27	1	6,8	6,36	6,68	0,51	27,09	2,644	2,777	1,08	2,07	94,55	2,162	10,141
141	21,4	16,13	0	6,6	4,15	4,53	0,52	11,41	1,727	1,696	0,44	0,91	218,6	1,978	6,765
142	22,4	13,33	1	6,8	12,76	14,90	0,54	16,20	2,804	3,424	1,83	2,28	145	1,813	6,742
143	22,1	11,23	1	6,5	6,53	5,10	0,44	15,94	2,405	2,841	1,28	2,14	159,3	1,874	7,733
144	22,3	11,17	1	6,8	10,88	4,82	0,31	18,08	2,480	2,590	1,13	1,69	107,4	2,120	8,506
145	25,9	0,83	15	7,1	4,75	3,80	0,44	10,75	0,342	1,577	3,32	2,79	94,19	0,481	36,627
146	25,9	0,90	14	7,2	3,65	3,69	0,50	11,55	0,605	1,234	3,53	3,41	104,9	1,085	22,287
147	25,8	0,87	9	7,3	20,12	5,05	0,20	14,69	0,331	1,778	1,14	2,57	102,3	0,412	51,820
148	26,9	0,97	17	7,2	8,35	2,65	0,24	12,32	0,549	2,045	2,7	2,98	80,96	0,595	26,156
149	27,1	1,00	16	6,9	12,28	3,75	0,23	13,20	0,464	1,839	2,93	2,56	81,45	0,559	33,211
150	26,8	1,00	15	7,1	14,54	1,23	0,08	10,12	0,267	1,296	5,64	3,47	76,95	0,456	44,228
151	25,7	0,83	20	7	5,61	3,82	0,40	8,63	1,095	2,066	2,17	3,44	85,97	1,174	9,189
152	25,9	0,93	19	7	9,51	14,50	0,60	22,22	1,719	3,134	2,78	2,46	90,29	1,214	15,087
153	25,8	1,03	20	7	6,72	6,01	0,47	14,46	1,025	2,962	2,43	2,88	85,6	0,766	16,463
154	25,3	1,73	27	7,3	23,61	4,51	0,16	10,55	0,836	1,133	3,17	2,75	81,87	1,634	14,718
155	25,4	1,97	27	7,3	21,39	5,39	0,20	13,89	0,677	1,382	3,15	3,33	101,1	1,085	23,918
156	25,6	1,70	27	7,3	30,31	5,09	0,14	12,16	0,424	1,428	2,76	2,48	103,9	0,657	33,494
157	25,4	2,63	23	7,4	14,32	2,09	0,13	7,99	0,012	1,024	2,13	3,14	124,2	0,025	805,249
158	25,2	3,23	22	7,3	14,23	1,67	0,10	7,86	0,067	0,924	1,99	2,47	84,6	0,161	136,342
159	25,4	2,27	28	7,3	13,88	1,22	0,08	8,78	0,127	1,002	2,03	3,22	102,9	0,282	80,367

Anexo C. Continuação...

Amostra	Temp	RDL	Sal	pH	Chl	Pha	PAP	COT	N	P	M.O.	CaCO3	Grain	N/P	C/N
160	25,3	2,13	27	7,6	7,61	4,67	0,38	13,17	0,133	1,498	3,76	3,47	131,6	0,197	115,552
161	25,3	1,40	29	7,8	2,74	0,35	0,11	6,30	0	0,562	0,67	1,54	121,3	0	0
162	25,3	0,90	27	7,7	3,50	0	0	6,92	0,048	0,420	1,05	2,46	130,7	0,254	167,399

Anexo D. Matriz de dados da macrofauna bêntica coletada no período chuvoso (março e abril) e no período seco (outubro e novembro) de 2012 na Baía de Guaratuba que foram utilizados para as análises do Capitulo 2 e 3.

Taxa / Amostra	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – simple Polyp sp.1	1	6	3	4	6	5	3	0	0	0	0	0	0	1	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	1	18	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea sp.1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Oligochaeta	4	0	5	0	2	1	2	2	2	63	28	28	11	34	27	0	0	50
Alitta succinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aricidea spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Heteromastus cf. *similis*	5	7	1	0	4	1	2	2	1	0	0	1	0	0	0	1	2	0
Isolda pulchella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	0	1	0	0	1	2	2	0	4	0	0	0	3	2	1	0	0	0
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	32	46	32	67	42	39	15	31	50	29	34	30	37	36	38	22	11	25
Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio multibranchiata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sigambra grubii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sigambra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulla sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	0	1	0	1	1	0	1	1	1	0	0	1	1	1	0	0	1	0
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma constricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma tenta	1	5	7	4	3	5	6	2	3	0	0	1	0	0	0	0	2	0
Mytella guayanensis	22	51	44	63	25	45	28	37	39	3	5	3	4	3	10	0	0	0
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus divisus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	1	13	24	90	49	69	9	15	4	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	9	4	4	2	3	4	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	1259	2244	1873	2247	1168	1855	1685	1638	1305	2	1	5	20	60	10	0	0	1
Senticaudata sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	2	1	5	8	2	1	1	5	5	2	0	0	1	2	5	1	1	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	1	0	3	2	0	0	0	0	0	0	0	0	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Panopeidae sp.1	0	2	0	3	3	4	1	1	0	0	1	0	0	0	0	0	0	0
Alpheus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	8	5	10	4	14	5	7	5	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	3	6	10	20	19	15	2	3	10	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	8	11	12
Ostracoda	46	335	344	381	249	341	51	323	219	273	231	256	92	224	306	110	211	113
Monokalliapseudes schubarti	74	36	112	145	222	112	75	281	77	94	85	125	100	113	121	131	163	230
Sinelobus stanfordi	109	273	309	132	70	140	148	131	158	3	0	6	26	31	43	0	1	0
Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	46	119	182	201	157	172	165	131	116	76	214	160	758	1194	1030	15	8	3

Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	2	6	7	7	4	0	8	4	3	4	6	2	4	1	0	0	1	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	0	0	0	0	0	0	0	3	0	6	21	16	34	0	3	4
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	3
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oligochaeta	0	1	11	0	0	0	6	2	7	244	8	16	27	92	92	132	137	68
Alitta succinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aricidea spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	0	0	0	0	0	0	0	0	0	5	0	5	5	19	4	5	16	6
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Glycinde multidens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heteromastus cf. *similis*	0	1	0	0	0	0	0	0	0	8	0	1	1	2	2	1	5	0
Isolda pulchella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	0	0	1	0	0	0	0	0	1	49	8	9	44	72	112	58	91	50
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	4	17	21	22	5	8	20	8	30	41	3	5	36	32	30	21	28	18
Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio multibranchiata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sigambra grubii	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	7	2
*Sigamb*ra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	0	0	0	0	0	0	0	0	0	1	0	0	1	6	1	0	0	0
Bulla sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	4	3	0	35	76	34	36	76	14	1	1	18	40	7	54	12	0	1
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma constricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma tenta	5	8	1	18	25	27	9	15	12	0	0	0	0	0	0	0	0	0
Mytella guayanensis	6	7	9	55	63	51	11	21	27	10	4	2	10	14	29	15	5	13
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Tagelus divisus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	2
Tellina sp.1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	15	15	14	3	3	7	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	73	8	42	1329	1736	1336	1404	1432	1564	0	0	0	0	0	0	0	0	0
Senticaudata sp.1	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	4	0	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	0	0	0	1	4	3	0	3	3	0	0	0	0	0	0	2	2	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	0	0	0	0	0	0	5	1	1	1	4	5	8	3	2
Panopeidae sp.1	0	0	0	1	3	3	0	1	7	0	0	0	0	1	0	0	0	0
Alpheus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	1	7	4	7	1	3	4	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	1	0	1	2	6	1	1	1	2	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	357	237	180	468	491	168	396	284	416	6	0	9	11	7	19	5	1	0
Monokalliapseudes schubarti	196	197	173	99	82	100	71	184	276	0	0	0	0	0	0	0	1	1

Sinelobus stanfordi	11	4	10	433	604	496	368	440	436	0	0	0	0	0	0	0	0	0
Acari sp.1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	6	10	7	6	3	6	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	1	1	0	0	2	1	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	384	424	228	503	491	384	420	544	372	0	0	0	0	0	0	0	0	1
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	7	1	5	14	12	3	1	11	5	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	0	9	0	1	7	2	0	2	0	0	0	0	0	2	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	1	0
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oligochaeta	11	7	4	63	40	23	377	62	2	47	4	74	186	78	78	449	552	131
Alitta succinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aricidea spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	0	1	0	3	3	2	5	2	0	4	3	3	2	5	6	22	14	4
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heteromastus cf. *similis*	4	11	13	10	8	15	8	4	0	9	5	22	6	8	22	3	1	4
Isolda pulchella	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	2	0	0
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	69	90	68	63	80	85	118	50	11	74	29	56	170	188	141	112	100	68
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	10	24	46	31	30	18	13	21	0	17	16	9	7	11	16	3	6	7
Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio multibranchiata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sigambra grubii	0	3	0	1	1	0	0	1	0	1	1	4	0	0	1	0	0	0
Sigambra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	1	0	0	0	0	2	1	0	0	0	0	3	1	0	2	10	0	0
Bulla sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	0	0	0	2	0	2	0	0	0	7	1	5	3	8	2	2	0	0
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Phacoides pectinatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma constricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	0	0	0	1	0	2	0	0	0	1	3	1	0	0	0	0	0	0
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus divisus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senticaudata sp.1	0	2	0	0	0	4	0	0	0	0	1	1	0	0	2	0	0	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	0	0	0	0	0	1	0	0	0	1	0	1	1	1	1	0	0	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	2	2	6	4	2	2	0	3	0	0	0	0	0	0	1	3	4	4
Panopeidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Alpheus sp.1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Ostracoda	0	0	1	0	1	1	0	0	0	4	3	0	1	2	0	2	0	0
Monokalliapseudes schubarti	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0
Sinelobus stanfordi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	1	0	0	0	2	0	0	0	0	0	5	0	0	0	1	1
Chironomidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	0	1	0	0	0	1	1	0	0	3	0	0	0	0	0	0	2
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Plathelminthes sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea sp.1	2	2	4	0	0	0	1	1	1	0	0	1	1	2	0	1	1	1
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oligochaeta	6	1	3	2	1	6	0	1	3	11	1	3	6	14	11	8	9	14
Alitta succinea	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Aricidea spp.	25	0	10	20	17	37	0	5	26	224	128	135	193	132	179	186	133	208
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	3	2	7	2	1	6	1	16	13
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	4	0	1	2	0	2	0	4	2	0	0	0	0	0	0	0	0	0
Diopatra sp.1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	1	1	0	0	5	1	0	1	1	1	0	0	0	1	0	1	0	0
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	5	0	0	4	1	3	0	1	2	1	2	2	0	1	0	3	1	2
Heteromastus cf. *similis*	16	3	11	12	5	11	0	15	12	0	0	0	0	0	0	0	5	0
Isolda pulchella	1	0	0	3	2	0	0	1	2	1	1	0	1	2	0	0	0	1
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	1	0	0	2	0	4	0	3	1	3	0	1	2	3	3	4	3	4
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	1	0	1	0	3	0	0	1	0	1	0	1	0	1	3	1	4	2
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	22	0	10	3	2	10	0	4	2	7	3	4	4	12	9	8	5	5
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Nephtys fluviatilis	2	0	6	1	3	5	0	2	2	0	0	0	0	1	0	0	1	1
Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio multibranchiata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	1	0	3	0	0	2	0	0	3	0	0	1	1	0	0	0	0	0
Sigambra grubii	4	0	3	0	1	1	0	3	2	0	2	0	3	1	1	2	3	3
Sigambra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	1	0	0	0	0	0	0	0	0	2	1	0	0	0	1	0
Streblospio cf. *benedicti*	72	1	20	53	13	57	0	21	40	0	0	2	0	1	2	1	0	0
Bulla sp.1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	3	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	5	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0

Stramonita haemastoma	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	1	0	1	0	0	2	0	1	0	1	1	1	1	3	0	1	1	2
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	0	0	0	0	0	1	0	0	1	3	0	0	2	1	0	0	2	2
Macoma constricta	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	1	0	0	0	0	1	0	1	1	0	0	0	0	0	1	0	0	0
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	4	0	2	2	3	1	0	1	0
Tagelus divisus	5	2	6	9	3	6	1	9	6	0	0	0	0	0	0	0	0	0
Tellina cf. *versicolor*	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	1	0	1	0	0	0	0	2	0	0	0	0	0	1	2	3	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senticaudata sp.1	6	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Brachyura juvenil	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Uca thayeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panopeidae sp.1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Alpheus sp.1	3	1	1	0	0	0	0	1	0	0	0	0	0	0	1	1	1	0
Harpacticoida sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	6	6	3	1	2	3	0	1	2	1	0	0	0	2	0	1	0	0
Monokalliapseudes schubarti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sinelobus stanfordi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acari sp.1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**86**	**87**	**88**	**89**	**90**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	1	0	0	0	12	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea sp.1	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	4	0	0
Oligochaeta	5	12	5	0	0	0	0	0	0	40	8	13	16	20	16	44	4	60
Alitta succinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aricidea spp.	54	28	45	38	45	36	3	9	10	0	0	0	0	0	0	0	0	0
Armandia hossfeldi	2	1	5	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	1	0	2	3	2	1	0	1	0	0	0	0	0	0	0	0	0
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	1	1	2	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0
Heteromastus cf. *similis*	2	0	3	2	3	0	0	2	0	1	0	2	0	0	0	0	0	4

Isolda pulchella	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Leiocapitellides sp.1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	1	0	13	1	6	2	3	4	2	0	0	0	0	0	0	0	0	0
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	12	4	0	16	0	6	5	7	4	0	0	0	0	0	0	0	0	0
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	0	0	0	0	0	0	0	0	0	31	32	24	20	0	44	32	16	32
Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio multibranchiata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sigambra grubii	2	1	6	0	1	2	0	0	1	0	0	0	0	0	0	0	0	0
*Sigamb*ra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	4	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
Bulla sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	0	0	0	1	0	1	0	0	0	1	7	2	0	12	0	16	0	0
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	10	8	5	16	16	28	9	17	13	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Macoma constricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	3	3	24	28	16	0	8	4
Mytella guayanensis	3	1	0	2	2	2	0	0	0	19	15	40	152	176	76	132	72	108
Pitar cf. fulminata	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus divisus	2	1	1	9	7	4	2	8	2	0	0	0	0	0	0	0	0	0
Tellina cf. *versicolor*	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	0	3	5	2	9	4	7	18	8	0	0	0	0	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	0	0	0	0	3	2	8	12	32	4	20	12
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	20	0	12	0	0	0	0

Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	0	0	0	0	0	0	0	0	0	59	264	702	1140	1700	1120	1404	1012	852
Senticaudata sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	0	0	0	1	0	0	0	0	0	1	0	0	4	8	0	0	0	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	1	0	0	0	0	0	1	0	4	12	0	4	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panopeidae sp.1	0	0	0	0	1	0	0	0	0	0	0	0	0	16	4	8	0	4
Alpheus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	0	0	1	0	12	0	12	12	8
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	7	1	9	4	16	0	0	0	4
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	0	0	0	1	1	0	3	0	1	290	334	439	148	364	224	432	308	256
Monokalliapseudes schubarti	0	0	0	0	0	0	0	0	0	316	428	280	236	144	268	200	120	480
Sinelobus stanfordi	0	0	0	0	0	0	0	0	0	2	6	3	280	292	272	332	220	284
Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	0	0	0	0	0	0	0	0	0	72	202	149	184	228	132	272	92	172
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	0	0	0	0	4	6	8	12	20	4	12	4	4
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**100**	**101**	**102**	**103**	**104**	**105**	**106**	**107**	**108**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	32	28	0	72	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea sp.1	0	0	1	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0
Hirudinea sp.1	1	1	1	3	3	0	1	0	0	0	0	0	0	0	4	0	0	0
Oligochaeta	25	74	13	153	213	317	40	51	29	0	4	4	0	0	0	4	0	0
Alitta succinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aricidea spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
Capitella cf. *capitata*	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heteromastus cf. *similis*	1	3	0	1	0	1	0	0	0	4	4	4	0	0	4	0	4	0
Isolda pulchella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	0	1	2	1	4	3	3	0	0	0	0	4	4	0	0	0	4	4
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	18	15	19	10	8	10	14	16	26	20	44	40	28	20	36	32	32	36
Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Prionospio multibranchiata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sigambra grubii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*Sigamb*ra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Bulla sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	0	1	0	0	1	0	0	0	1	16	0	0	4	0	0	8	0	0
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma constricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma tenta	1	0	1	0	1	0	1	0	0	4	0	0	4	0	4	4	0	0
Mytella guayanensis	70	66	45	68	52	31	54	8	207	88	200	180	272	280	264	420	228	264
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus divisus	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0

Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	2	0	0	2	0	0	0	0	0	20	0	16	0	20	16	16	16	4
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0
Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	8	0	0
Monocorophium acherusicum	159	201	78	140	259	37	0	3	2	2424	2560	1416	2312	1980	2480	2680	1924	1608
Senticaudata sp.1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	2	1	0	0	5	0	0	2	4	0	0	0	4	4	0	0	4	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	4	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panopeidae sp.1	2	0	0	1	0	0	0	0	0	0	0	0	0	4	0	8	0	0
Alpheus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	0	1	0	0	0	0	0	0	0	0	4	8	4	0	16	8
Uromunna cf. *peterseni*	1	0	0	0	1	0	0	1	0	0	4	0	8	0	0	4	8	0
Pseudosphaeroma cf. *jakobii*	5	5	2	7	15	4	13	9	8	0	0	0	0	0	0	0	0	0
Ostracoda	74	120	41	27	45	41	131	78	86	588	468	320	844	732	188	1028	496	200
Monokalliapseudes schubarti	182	259	150	81	75	32	58	53	103	184	424	116	164	28	272	504	148	104
Sinelobus stanfordi	2	2	5	3	3	1	1	0	0	420	124	284	360	452	320	448	316	420

Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	3	8	5	1	4	2	5	2	11	88	104	84	88	104	108	92	76	72
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	1	0	0	1	0	0	1	0	16	8	16	16	16	12	8	4	8
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**109**	**110**	**111**	**112**	**113**	**114**	**115**	**116**	**117**	**118**	**119**	**120**	**121**	**122**	**123**	**124**	**125**	**126**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	1	2	6	3	11	20	3	4	26	0	0	0	0	0	0	1	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea sp.1	0	0	0	1	1	2	0	0	0	0	1	0	1	0	1	1	0	0
Hirudinea sp.1	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oligochaeta	41	35	20	109	124	132	112	76	120	102	123	116	120	382	219	272	242	37
Alitta succinea	2	0	0	0	0	1	0	0	0	1	0	0	1	2	0	0	1	0
Aricidea spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	13	15	17	20	23	14	59	14	42	25	25	13	101	91	170	57	95	27
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heteromastus cf. *similis*	16	19	4	10	5	5	4	5	0	9	11	10	2	4	8	3	5	4
Isolda pulchella	1	3	1	1	2	0	3	0	0	3	1	2	2	0	1	1	3	0
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	87	190	97	93	190	124	85	77	66	85	61	122	34	43	64	73	65	12
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	7	10	14	7	15	6	29	31	17	12	9	7	9	4	6	7	5	0
Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio multibranchiata	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	1	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Sigambra grubii	5	6	3	0	1	1	4	3	6	0	2	5	2	4	5	2	3	0
*Sigamb*ra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	16	1	1	2	2	1	4	1	1	10	14	7	12	4	7	14	24	1
Bulla sp.1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	3	0	3	0	0	3	0	0	2	0	0	0	0	0	0	0	0	0
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Anomalocardia flexuosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

Macoma constricta	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	2	4	5	2	3	2	2	0	1	0	0	0	0	2	0	3	1	1
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus divisus	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina cf. *versicolor*	1	0	2	0	2	0	1	1	0	0	1	0	1	0	0	0	1	0
Tellina sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senticaudata sp.1	39	2	0	1	0	0	7	3	1	1	2	2	5	0	0	9	1	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	0	6	3	0	5	3	1	2	0	1	0	0	2	0	0	0	0	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	6	1	4	6	6	4	3	2	4	0	0	8	5	9	6	10	5	0
Panopeidae sp.1	3	0	0	1	0	1	2	2	0	0	0	0	0	0	0	0	2	0
Alpheus sp.1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	4	2	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Monokalliapseudes schubarti	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0
Sinelobus stanfordi	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	1	0	0	2	0	1	0	0	0	0	1	2	0	1	35	20	5
Chironomidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dolichopodidae	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	10
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**127**	**128**	**129**	**130**	**131**	**132**	**133**	**134**	**135**	**136**	**137**	**138**	**139**	**140**	**141**	**142**	**143**	**144**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	1	1	2	2	1	4	0	0	4	0	1	0	0	0	0	0	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Nemertea sp.1	0	1	0	0	2	0	0	1	0	0	0	0	1	1	1	0	0	2
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oligochaeta	53	50	29	284	331	75	400	180	270	2	41	7	0	2	2	10	0	0
Alitta succinea	2	1	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
Aricidea spp.	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	80	12	23	27	93	16	32	19	39	7	4	12	0	5	6	4	0	8
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	1	0	0	1	0	0	2	0	1	0	0
Heteromastus cf. *similis*	6	2	11	3	4	6	4	8	7	14	14	4	0	8	10	9	0	8
Isolda pulchella	9	3	0	6	4	3	3	2	2	2	5	0	0	0	0	0	0	2
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	56	70	81	56	59	47	32	37	29	2	1	1	2	0	0	0	0	3
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	0	0	0	0	0	0	4	0	0	1	3	0	0	1
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Nephtys fluviatilis	3	3	9	11	1	12	3	0	4	9	12	3	3	2	7	5	0	6

Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio multibranchiata	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sigambra grubii	1	2	3	10	4	0	4	6	6	2	5	3	0	1	3	2	0	4
*Sigamb*ra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	6	3	1	8	5	3	2	1	0	29	127	48	32	28	77	116	0	62
Bulla sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Macoma constricta	0	0	0	0	0	0	0	0	0	3	3	0	0	0	2	0	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	1	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	1	0	0	0	0	2	2	2	0	0
Tagelus divisus	0	0	0	0	1	0	0	0	0	0	4	0	0	0	0	0	0	0
Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senticaudata sp.1	0	0	0	7	3	1	0	0	0	0	0	0	0	0	2	0	0	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	0	0	0	0	4	1	0	1	0	0	0	0	0	0	0	0	0	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	9	2	4	5	1	0	6	6	4	0	0	1	0	0	1	0	2	2

Panopeidae sp.1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alpheus sp.1	0	0	0	2	0	0	0	0	1	0	0	0	0	1	0	0	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monokalliapseudes schubarti	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Sinelobus stanfordi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	5	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**145**	**146**	**147**	**148**	**149**	**150**	**151**	**152**	**153**	**154**	**155**	**156**	**157**	**158**	**159**	**160**	**161**	**162**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	1	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea sp.1	0	1	0	0	1	1	0	1	0	0	2	0	0	1	1	3	0	0
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oligochaeta	7	3	15	16	0	15	12	5	17	1	11	3	3	1	0	0	1	0
Alitta succinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aricidea spp.	121	117	57	282	208	163	277	236	178	42	63	45	14	24	3	24	14	24
Armandia hossfeldi	0	0	0	0	0	0	1	0	2	0	0	0	2	0	1	0	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Glycinde multidens	1	3	1	1	3	0	0	2	1	1	1	1	2	1	0	1	1	1
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	1	2	0	1	0	0	1	5	2	2	2	2	0	1	0
Heteromastus cf. *similis*	4	1	1	2	1	9	2	0	0	1	1	5	0	0	0	0	0	0

Isolda pulchella	0	0	0	0	0	0	0	2	0	1	1	1	0	0	0	0	0	1
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	0	0	0	3	0	1	12	1	1	0	0	1	0	1	2	0	1	1
Leiocapitellides sp.1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	2	1	3	2	3	0	2	5	7	19	12	5	8	3	3	10	7
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	8	0	0	1	3	12	1	5	3	19	30	22	5	8	0	11	5	9
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio multibranchiata	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	1	0	0	0	0	0	2	2	0	0	0	0	0	0	0
Sigambra grubii	0	1	0	5	0	1	4	2	4	4	5	4	2	4	2	5	1	6
Sigambra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Spiophanes duplex	1	2	0	1	1	1	0	0	2	0	2	2	0	0	1	1	1	2
Streblospio cf. *benedicti*	4	3	5	2	1	0	2	1	3	4	5	3	0	0	0	0	1	1
Bulla sp.1	4	2	0	0	0	1	0	4	0	2	1	0	0	1	0	0	1	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	6	6	10	1	0	2	2	7	2	4	3	7	3	6	10	6	8	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Phacoides pectinatus	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma constricta	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	1	3	1	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	1	6	0	3	0	3	10	10	16	32	13	9	14	8
Tagelus divisus	1	1	0	0	0	0	1	5	1	0	0	0	0	0	0	0	0	0
Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	5	3	0	0	1	1	1	2	2	2	3	0	4	6	14	6	5	1
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senticaudata sp.1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panopeidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alpheus sp.1	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	1	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	3	2	0	0	1	0	0	2	0	0	0	0	0	1	0	0	0	0
Monokalliapseudes schubarti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sinelobus stanfordi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**163**	**164**	**165**	**166**	**167**	**168**	**169**	**170**	**171**	**172**	**173**	**174**	**175**	**176**	**177**	**178**	**179**	**180**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – simple Polyp sp.1	7	1	3	0	4	0	0	0	0	0	0	0	4	0	36	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea sp.1	3	0	1	8	0	0	0	4	0	4	0	4	4	0	0	12	8	12
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0
Oligochaeta	7	0	11	12	52	16	44	112	52	8	0	68	0	56	56	248	100	0
Alitta succinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aricidea spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heteromastus cf. *similis*	0	0	0	0	0	4	0	0	0	0	0	0	4	0	8	4	0	0
Isolda pulchella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	5	2	4	0	0	4	0	0	4	16	28	16	0	12	4	24	24	16
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	22	22	22	32	20	8	24	12	20	28	36	16	56	24	28	20	12	24
Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Prionospio multibranchiata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sigambra grubii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*Sigamb*ra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulla sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	5	2	5	0	8	0	8	8	4	0	4	4	0	4	4	12	0	0
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma constricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma tenta	1	0	0	8	8	12	24	24	12	8	0	0	0	0	0	0	0	0
Mytella guayanensis	45	61	86	112	220	188	112	112	128	264	280	200	168	592	136	248	172	232
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus divisus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	2	12	28	16	16	28	40	0	0	0	4	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	666	1293	987	1380	1804	1128	1036	1640	1528	2620	3056	1464	3380	3336	2348	2588	1756	1744
Senticaudata sp.1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	1	1	0	0	4	0	0	4	0	12	16	0	0	4	8	4	0	4
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	1	1	0	4	0	0	4	0	0	0	0	4	0	0	0	0	4
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panopeidae sp.1	0	0	0	4	12	16	0	4	0	0	0	0	0	0	0	0	0	0
Alpheus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	0	12	20	12	12	12	0	4	4	0	4	12	4	4	0	0
Uromunna cf. *peterseni*	4	0	11	8	16	0	4	20	12	0	0	4	0	4	20	8	0	16
Pseudosphaeroma cf. *jakobii*	2	0	1	0	0	0	0	0	0	0	0	4	4	4	0	0	4	0
Ostracoda	498	300	499	576	664	400	324	476	368	244	340	148	228	232	292	64	36	24
Monokalliapseudes schubarti	255	335	354	160	248	248	252	272	264	1116	592	1060	832	740	576	248	0	56
Sinelobus stanfordi	3	2	13	224	476	248	240	256	300	8	4	0	0	16	0	4	68	12

Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	226	205	208	112	164	108	168	188	252	124	64	104	84	72	112	0	32	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	7	10	10	0	8	4	12	12	12	8	12	4	4	16	4	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**181**	**182**	**183**	**184**	**185**	**186**	**187**	**188**	**189**	**190**	**191**	**192**	**193**	**194**	**195**	**196**	**197**	**198**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	0	0	0	0	0	0	0	10	1	0	12	2	1	4	2	0
Cnidaria – simple Polyp sp.1	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea sp.1	0	0	0	0	0	0	0	0	0	0	0	2	2	2	1	1	2	2
Hirudinea sp.1	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oligochaeta	0	4	8	4	16	4	0	12	0	86	22	15	59	154	16	66	131	125
Alitta succinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aricidea spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	0	0	0	0	0	0	0	0	0	45	7	11	40	45	12	16	3	2
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heteromastus cf. *similis*	4	4	8	4	0	4	4	0	0	32	0	2	4	9	10	0	4	2
Isolda pulchella	0	0	0	0	0	0	0	0	0	2	0	0	3	0	0	0	0	1
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	12	8	8	4	16	0	0	4	0	198	46	30	171	145	90	71	53	64
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	36	24	20	52	28	24	28	36	52	20	39	10	7	19	21	9	23	14
Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio multibranchiata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sigambra grubii	0	0	0	0	0	0	0	0	0	0	2	3	1	4	6	3	1	3
*Sigamb*ra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	0	0	0	0	0	0	0	0	0	3	2	2	1	18	5	0	0	0
Bulla sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	4	4	4	0	4	0	0	8	0	1	0	0	5	1	0	0	0	0
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Macoma constricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma tenta	0	0	0	8	0	0	0	4	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	616	336	400	140	152	36	140	172	92	8	0	1	3	1	0	0	1	1
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
Tagelus divisus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	3	0	2	1	1	0	0	3	0
Tellina sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	20	8	12	48	28	8	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	4	0	0	16	8	8	0	48	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	4	0	4	0	0	12	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	1772	1616	1852	1836	1524	884	1432	1884	1776	0	0	0	2	0	0	0	0	0
Senticaudata sp.1	0	0	0	0	0	0	0	0	0	1	2	0	0	1	5	0	1	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	0	0	0	4	4	0	0	8	8	0	1	1	1	0	0	0	1	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	8	0	4	0	0	8	8	0	1	0	0	0	0	0	0	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	9	6	9
Panopeidae sp.1	0	0	4	0	8	0	4	0	0	3	0	0	0	0	0	0	0	2
Alpheus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Cassidinidea fluminensis	4	0	0	4	0	0	4	8	8	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	4	4	12	4	8	4	0	16	0	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	652	552	456	408	408	0	356	900	248	1	0	0	0	0	0	0	0	2
Monokalliapseudes schubarti	288	540	464	428	528	196	144	396	432	0	0	0	0	2	0	0	0	0
Sinelobus stanfordi	680	268	696	148	284	164	232	232	196	0	0	0	0	0	0	0	0	0
Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	12	4	28	8	4	16	16	12	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	4	0	0	0	0	28	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**199**	**200**	**201**	**202**	**203**	**204**	**205**	**206**	**207**	**208**	**209**	**210**	**211**	**212**	**213**	**214**	**215**	**216**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	1	0	0	0	0	0	0	0	0	0	0	1	0	2	0	1	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Nemertea sp.1	1	0	0	0	0	0	1	0	0	4	0	0	1	0	0	1	0	0
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oligochaeta	508	6	18	2	30	187	605	64	130	0	0	0	1	0	16	0	0	0
Alitta succinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aricidea spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	44	32	40	3	49	24	105	15	59	50	73	27	78	41	46	27	32	23
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Heteromastus cf. *similis*	14	7	11	0	0	1	7	4	1	12	12	1	8	8	25	5	0	8
Isolda pulchella	0	1	6	1	0	2	0	0	0	3	5	0	4	2	2	0	1	1
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	133	76	67	40	0	123	65	14	33	85	115	55	65	75	31	25	19	103
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	12	11	5	1	2	6	1	8	14	7	22	8	5	2	8	5	10	9

Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio multibranchiata	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sigambra grubii	6	9	2	0	1	3	2	1	3	2	3	0	2	0	4	1	0	1
*Sigamb*ra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	16	2	3	0	0	7	3	0	3	5	3	1	0	0	5	0	4	1
Bulla sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	0	0	0	0	0	0	0	0	0	0	0	2	1	0	1	1	0	1
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Phacoides pectinatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma constricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	0	0	0	0	0	1	0	0	0	2	3	0	0	0	2	0	0	2
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	2	0
Tagelus divisus	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Tellina cf. *versicolor*	0	0	1	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0
Tellina sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Senticaudata sp.1	7	1	0	0	2	0	8	0	1	0	0	0	0	1	3	1	5	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	1	0	0	0	0	0	1	0	0	0	1	0	1	0	1	0	0	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	8	2	2	1	2	0	2	0	1	0	0	0	5	0	2	0	0	0

Panopeidae sp.1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Alpheus sp.1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Monokalliapseudes schubarti	0	0	0	0	0	0	0	0	0	1	3	1	0	0	0	0	0	0
Sinelobus stanfordi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	2	1	1	0	0	0	0	0	2	0	0	0
Chironomidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**217**	**218**	**219**	**220**	**221**	**222**	**223**	**224**	**225**	**226**	**227**	**228**	**229**	**230**	**231**	**232**	**233**	**234**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea sp.1	0	3	0	0	4	1	1	3	3	1	0	2	4	1	0	0	0	1
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oligochaeta	0	11	0	1	3	1	3	6	1	14	12	24	8	6	14	19	3	0
Alitta succinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aricidea spp.	0	27	0	13	66	22	19	33	44	197	97	197	166	183	191	210	68	45
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	0	1	0	0	2	1	1	0	0	1	0	3	0	0	0	0	0	1
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	1	2	0	3	1	4	4	1	4	0	2	3	0	1	0	0	1	0
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	2	0	2	1	1	3	3	1	0	0	1	1	1	1	1	0	0
Heteromastus cf. *similis*	0	5	0	2	17	22	4	20	0	13	1	3	3	0	3	13	2	2

Isolda pulchella	0	1	0	0	1	2	0	1	0	0	0	0	1	0	0	0	0	0
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	0	0	0	0	0	0	0	0	0	1	2	3	6	0	2	6	0	0
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	2	0	1	2	0	0	0	0	0	1	7	4	2	2	5	0	0
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	25	0	9	41	16	11	39	0	3	4	30	16	14	6	17	0	1
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	0	1	0	0	0	5	0	3	1	0	0	0	0	0	0	0	0	0
Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio multibranchiata	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0
Prionospio pinnata	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	1	0	1	9	3	1	6	0	0	1	3	0	1	1	3	1	2
Sigambra grubii	0	9	0	5	10	1	1	9	4	0	0	13	9	1	1	6	0	0
*Sigamb*ra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0
Streblospio cf. *benedicti*	0	54	0	86	112	74	56	174	92	6	0	4	4	0	3	5	0	0
Bulla sp.1	0	0	0	0	0	0	0	0	0	2	0	3	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	0	0	0	0	0	0	0	2	0	0	0	2	0	1	0	0	0	0
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Anomalocardia flexuosa	0	0	0	0	1	0	0	1	0	8	9	31	16	13	0	7	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
Macoma constricta	0	0	0	0	1	0	0	2	0	2	1	0	2	1	1	3	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	0	2	0	0	2	1	0	0	0	4	2	0	0	0	0	0	0	0
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	3	3	6	0	2	4	7	2	0	4	0	0	0	1	3
Tagelus divisus	0	0	0	0	0	0	0	0	0	0	0	1	0	2	2	0	0	0
Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	0	2	0	0	0	0	0	0	0	2	1	2	0	1	0	2	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	0	4	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Senticaudata sp.1	0	2	0	0	5	0	0	8	0	0	0	0	0	0	0	0	0	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Brachyura Megalopa	0	1	0	1	0	0	0	0	0	1	1	0	0	0	0	2	0	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panopeidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alpheus sp.1	0	0	0	3	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.2	0	16	0	0	4	0	0	0	0	0	0	68	0	2	0	43	0	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	0	7	0	0	3	1	0	0	0	0	3	0	1	0	1	2	0	0
Monokalliapseudes schubarti	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sinelobus stanfordi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**235**	**236**	**237**	**238**	**239**	**240**	**241**	**242**	**243**	**244**	**245**	**246**	**247**	**248**	**249**	**250**	**251**	**252**
Ceriantharia sp.1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea sp.1	4	2	6	1	3	4	1	3	1	0	0	0	0	0	0	0	0	0
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	4	4	0	8	0	0	0	0	12
Oligochaeta	7	9	3	0	2	3	8	1	2	8	8	0	0	76	40	52	28	40
Alitta succinea	0	0	0	0	0	0	0	0	0	12	12	8	4	0	0	0	8	0
Aricidea spp.	92	45	81	22	31	33	28	12	3	0	0	0	0	0	0	0	0	0
Armandia hossfeldi	2	0	1	3	2	0	0	3	2	0	0	0	0	0	0	0	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	16	8
Capitella cf. *capitata*	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Diopatra sp.1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
Exogone sp.1	4	0	2	1	2	0	0	0	1	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	0	1	0	1	2	1	0	1	0	0	0	0	0	0	0	0	0

Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	1	1	1	4	1	1	1	2	1	0	0	0	0	0	0	0	0	0
Heteromastus cf. *similis*	0	0	2	0	1	4	0	1	0	0	0	0	0	0	0	0	0	0
Isolda pulchella	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	1	0	0	0	0	1	1	0	2	12	16	16	16	32	20	36	36	40
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	8	2	13	4	11	9	7	6	13	0	0	0	0	0	0	0	0	0
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	25	10	27	20	33	37	11	38	23	0	0	0	0	0	0	0	0	0
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	0	0	0	0	0	0	0	0	0	24	16	16	4	20	32	24	16	12
Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Prionospio multibranchiata	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	1	0	2	0	1	0	0	0	0	0	0	0	0	0	0
Sigambra grubii	7	1	9	1	6	7	5	5	5	0	0	0	0	0	0	0	0	0
*Sigamb*ra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	1	1	2	5	0	1	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	4	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	4
Bulla sp.1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	0	0	0	0	0	0	0	1	0	256	132	100	20	452	260	148	152	164
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	5	0	15	13	13	11	12	22	34	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Macoma constricta	0	5	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	1	0	0	1	0	2	4	6	5	4	8	12	4	8	0	0	4	0
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	6	16	6	0	10	17	0	0	0	0	0	0	0	0	0
Tagelus divisus	2	0	1	2	0	0	3	0	0	0	0	0	0	0	0	0	0	0

Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	0	0	1	6	0	1	5	6	6	0	0	0	0	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	1	0	0	60	76	80	40	68	100	64	68	84
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
Monocorophium acherusicum	0	0	0	0	0	0	0	0	0	1200	1000	1092	656	1388	792	488	1028	792
Senticaudata sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	0	0	1	0	1	0	1	2	1	4	8	0	4	4	4	0	12	8
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panopeidae sp.1	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	4	0	0
Alpheus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.2	27	1	18	4	14	0	0	6	68	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	8	8	20	0	12	4	12	12	4
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	48	152	20	0	52	28	12	8	4
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	2	0	0	0	0	1	0	1	5	100	88	48	0	76	68	64	40	48
Monokalliapseudes schubarti	0	0	0	0	0	0	0	0	0	768	648	892	612	888	644	480	688	632
Sinelobus stanfordi	0	0	0	0	1	0	0	0	0	484	280	324	264	508	440	284	292	332

Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	0	0	0	0	0	0	0	0	0	124	56	40	24	108	56	32	60	52
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**253**	**254**	**255**	**256**	**257**	**258**	**259**	**260**	**261**	**262**	**263**	**264**	**265**	**266**	**267**	**268**	**269**	**270**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	4	4	0	8	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0
Hirudinea sp.1	0	0	0	0	0	4	4	4	4	0	0	0	0	0	0	0	0	0
Oligochaeta	28	12	32	60	4	244	0	64	52	0	8	16	8	0	16	4	28	8
Alitta succinea	16	0	12	4	0	16	0	8	4	4	4	0	0	8	0	0	0	4
Aricidea spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Boccardiella cf. *truncata*	0	0	0	4	4	0	0	0	0	0	0	0	0	4	0	0	4	0
Capitella cf. *capitata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heteromastus cf. *similis*	4	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	0
Isolda pulchella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	44	44	36	24	28	32	16	32	20	0	4	8	32	16	20	24	36	12
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	32	24	16	4	8	16	24	16	20	16	12	12	0	12	20	28	28	20
Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio multibranchiata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sigambra grubii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*Sigamb*ra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulla sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	52	48	44	136	8	228	40	96	128	0	4	8	4	16	8	4	8	4
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Macoma constricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	20	12	48	4	4	0	0	0	16	24	44	32	12	0	8	12	20	12
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus divisus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	8	4	52	8	20	20	0	36	20	40	32	80	48	64	136	48	40
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	0	12	4	36	12	0	0	0	40	0	8	44
Monocorophium acherusicum	1028	2232	1324	1596	1644	2136	2560	2460	3716	484	924	1208	564	504	688	1368	1148	728
Senticaudata sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	16	8	8	0	0	4	0	0	0	0	0	0	0	8	12	24	4	4
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panopeidae sp.1	0	0	0	0	0	0	0	0	0	4	4	0	4	8	4	0	8	4
Alpheus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Cassidinidea fluminensis	64	80	56	32	68	120	96	40	48	84	80	80	80	76	76	56	56	52
Uromunna cf. *peterseni*	16	12	4	8	8	84	48	52	28	100	64	28	48	60	104	48	68	84
Pseudosphaeroma cf. *jakobii*	0	0	0	4	0	8	0	44	44	0	0	0	0	0	0	0	0	0
Ostracoda	72	76	36	32	20	32	96	252	324	188	100	32	124	68	112	32	60	68
Monokalliapseudes schubarti	464	264	524	312	388	284	0	292	540	164	356	412	408	232	424	324	212	288
Sinelobus stanfordi	356	396	468	192	224	132	164	32	104	200	508	440	152	176	124	168	200	176
Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	4	20	24	20	8	8	4	0	16	0	4	12	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**271**	**272**	**273**	**274**	**275**	**276**	**277**	**278**	**279**	**280**	**281**	**282**	**283**	**284**	**285**	**286**	**287**	**288**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	1	0	2	1	0	0	0	0	0	0	3	0	0	0	1	7	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	3	0	14	4	0	0	0	0	0	0	0	0	0	3	0	1	2
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	1	0	0	0	0	0	1	0	0	1	6	0	0	0

Nemertea sp.1	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	0
Hirudinea sp.1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0
Oligochaeta	0	22	0	41	21	0	0	0	0	0	0	0	0	0	3	25	6	5
Alitta succinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aricidea spp.	0	0	0	0	0	0	0	0	0	0	0	3	0	0	8	7	2	0
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	0	0	0	0	0	3	1	0	1	1	3	1	1	3	3	3	0
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heteromastus cf. *similis*	0	8	0	5	3	0	1	0	0	0	0	0	0	2	6	16	31	4
Isolda pulchella	0	2	0	3	1	0	0	0	0	0	0	1	0	0	1	2	0	0
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	0	0	0	11	6	0	1	0	0	0	0	0	0	0	0	1	1	1
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	0	8	0	19	5	1	2	1	0	0	1	0	0	0	0	2	6	2

Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio multibranchiata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	0	0	0	0	0	0	1	10	1	0	1	9	13	4	2
Sigambra grubii	0	4	0	2	0	0	0	1	0	0	4	0	0	0	4	0	0	0
*Sigamb*ra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	0	0	0	0	0	0	0	0	0	0	0	0	2	0	4	12	30	0
Bulla sp.1	0	0	0	0	1	0	0	0	0	0	3	0	1	5	12	7	13	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	0	32	1	48	57	1	0	46	15	154	14	31	37	74	110	58	147	120
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Anomalocardia flexuosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Phacoides pectinatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma constricta	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	3	37	0	23	9	1	4	14	2	2	7	30	2	1	7	5	26	5
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Tagelus divisus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina cf. *versicolor*	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	0	0	0	0	0	0	6	0	0	0	0	0	0	0	1	0	0	0
Senticaudata sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0

Panopeidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alpheus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	0	6	5	0	0	0	0	10	5	1	1	21	0	1	6	5	3	6
Monokalliapseudes schubarti	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Sinelobus stanfordi	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**289**	**290**	**291**	**292**	**293**	**294**	**295**	**296**	**297**	**298**	**299**	**300**	**301**	**302**	**303**	**304**	**305**	**306**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	12	2	2	1	1	3	0	1	1	0	0	0	0	0	0	0	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	10	4	5	2	3	0	10	0	5	0	0	0	0	0	0	0	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	1	1	2	2	2	0	0	0	0	0	0	0	0	0
Nemertea sp.1	2	0	3	0	0	1	2	0	1	0	0	0	0	0	0	0	0	0
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oligochaeta	31	107	81	16	19	3	9	0	4	0	0	0	0	0	0	0	0	0
Alitta succinea	0	1	1	0	0	0	4	1	0	0	0	0	0	0	0	0	0	0
Aricidea spp.	1	0	2	0	1	0	1	1	3	1	0	4	0	0	0	0	21	0
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	3	5	8	3	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	1	0	0	1	2	5	1	3	2	2	3	0	0	0	1	5	0
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Heteromastus cf. *similis*	15	9	11	18	31	17	33	7	46	0	0	0	0	0	0	0	4	0

Isolda pulchella	1	3	0	0	2	0	1	2	3	1	0	0	0	0	0	0	0	0
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	3	6	6	4	2	2	2	3	8	0	0	0	0	0	0	0	0	0
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	1	2	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2	0
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	0	0	0	0	0	7	0	2	0	0	0	0	16	0
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	5	4	3	9	9	9	7	3	9	0	0	0	0	0	0	0	0	1
Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	2	7	1	0	1	0	11	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio multibranchiata	0	1	2	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	0	1	1	1	1	4	4	0	6	0	0	0	0	1	0
Sigambra grubii	0	3	3	1	1	0	6	1	2	0	0	1	0	0	0	0	4	0
Sigambra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	2	4	1	0	6	0	2	0	1	0	0	2	0	0	0	0	13	0
Bulla sp.1	0	0	0	0	0	0	2	0	0	1	0	0	0	0	5	0	5	1
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	185	185	109	2	26	18	140	14	34	0	0	1	0	0	140	12	0	22
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	2	0	1
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma constricta	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	1	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	15	9	6	1	20	24	33	3	19	0	0	0	0	0	0	1	3	0
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus divisus	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Senticaudata sp.1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca maracoani	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panopeidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alpheus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	1	0	1	0	0	0	1	0	0	0	23	15	165	32	43	43	38	84
Monokalliapseudes schubarti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sinelobus stanfordi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**307**	**308**	**309**	**310**	**311**	**312**	**313**	**314**	**315**	**316**	**317**	**318**	**319**	**320**	**321**	**322**	**323**	**324**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea sp.1	0	0	7	3	0	10	8	0	1	1	0	0	1	1	4	0	0	2
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oligochaeta	0	0	2	27	0	5	0	0	39	0	0	0	2	4	6	0	1	0
Alitta succinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Aricidea spp.	0	0	103	113	0	67	34	0	105	3	4	7	26	24	27	9	7	9
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	1
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	0	3	1	0	5	4	0	5	0	0	0	5	4	1	1	4	2

Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	0	1	0	0	1	2	1	0	1	2	2
Heteromastus cf. *similis*	0	0	0	1	0	4	1	0	4	0	2	0	0	0	0	2	0	0
Isolda pulchella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Lumbrineridae sp.1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0
Magelona papillicornis	0	0	0	3	0	4	3	0	7	3	3	8	8	11	12	6	2	6
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Mediomastus sp.1	0	0	0	11	0	13	5	0	28	0	0	4	8	3	1	4	1	8
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orbinidae	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Prionospio multibranchiata	0	0	0	25	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	4	0	10	4	1	6	2	0	3	2	1	3	1	0	0
Sigambra grubii	0	0	4	6	0	7	4	0	3	0	0	0	8	8	12	5	4	4
*Sigamb*ra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	0	0	4	3	0	3	2	0	21	0	0	0	0	1	0	0	0	0
Bulla sp.1	0	0	0	3	0	2	0	0	0	0	0	1	0	0	1	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	0	0	2	3	1	0	0	0	2	0	0	0	0	0	0	1	1	0
Nassarius polygonatus	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	0	0	0	2	0	0	0	0	0	0	0	0	2	2	4	1	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Macoma constricta	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus divisus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Senticaudata sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panopeidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alpheus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	4	0	0	1
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	0	0	6	15	1	3	2	1	5	6	6	0	0	1	5	1	1	0
Monokalliapseudes schubarti	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Sinelobus stanfordi	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0

Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**325**	**326**	**327**	**328**	**329**	**330**	**331**	**332**	**333**	**334**	**335**	**336**	**337**	**338**	**339**	**340**	**341**	**342**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hirudinea sp.1	4	0	0	0	4	0	0	0	4	0	0	0	8	0	8	0	4	0
Oligochaeta	96	28	208	40	64	32	4	24	0	56	60	16	0	0	8	4	64	4
Alitta succinea	4	4	0	0	0	4	4	0	0	0	20	4	12	24	4	0	4	8
Aricidea spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	4	0	12	4	4	20	4	0	0	0
Capitella cf. *capitata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heteromastus cf. *similis*	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	0	0
Isolda pulchella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	68	12	24	12	24	12	8	8	16	16	52	36	64	40	28	16	16	20
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	12	12	16	36	8	12	8	12	20	12	12	28	16	16	20	12	12	4
Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio multibranchiata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sigambra grubii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*Sigamb*ra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulla sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	120	100	140	212	204	232	28	196	72	28	12	52	44	44	40	8	100	40
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Macoma constricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	0	0	0	4	8	0	4	4	0	4	40	16	16	32	8	0	0	12
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus divisus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	92	64	68	24	48	40	24	28	20	4	0	0	16	28	16	28	36	36
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	8	0	0	0	0	0	0	0	4	0	0	4	4	0	4	0	0	0
Monocorophium acherusicum	484	368	668	436	544	296	320	420	436	384	224	464	828	564	780	464	984	628
Senticaudata sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	0	4	0	0	0	0	0	0	4	0	0	4	0	8	4	4	0	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panopeidae sp.1	0	4	0	0	0	0	0	4	0	0	0	0	0	4	0	0	0	0
Alpheus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Cassidinidea fluminensis	4	0	8	12	20	12	8	8	8	8	12	52	68	32	48	56	72	44
Uromunna cf. *peterseni*	56	20	20	24	28	48	16	36	8	4	4	0	4	4	24	16	4	8
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	8	0
Ostracoda	96	84	84	40	112	60	32	56	44	56	32	44	116	32	80	20	20	8
Monokalliapseudes schubarti	512	536	940	676	548	676	636	1040	800	524	356	496	1024	652	492	560	564	644
Sinelobus stanfordi	396	312	428	436	408	408	268	416	260	380	268	396	488	376	360	128	176	156
Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	88	72	92	24	48	44	4	0	20	4	12	16	24	12	16	20	12	4
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	4	0	0	0	0	4	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**343**	**344**	**345**	**346**	**347**	**348**	**349**	**350**	**351**	**352**	**353**	**354**	**355**	**356**	**357**	**358**	**359**	**360**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	0	0	0	0	0	0	0	2	0	5	0	3	9	0	0	1
Cnidaria – simple Polyp sp.1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	0	0	0	0	0	0	0	0	2	9	26	25	27	15	0	18	18
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	0	0	0	0	0	7	0	18	4	0	0	0	2	0

Nemertea sp.1	0	0	0	0	0	0	0	0	0	0	2	4	1	0	0	0	0	4
Hirudinea sp.1	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oligochaeta	4	16	4	0	0	0	36	24	52	310	83	78	485	15	89	0	147	3
Alitta succinea	4	4	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Aricidea spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	0	0	0	0	0	0	0	0	0	7	0	12	2	3	3	0	1	1
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	0	0	0	0	0	0	0	0	0	0	5	2	0	0	0	0	2
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heteromastus cf. *similis*	0	4	4	0	0	0	0	0	0	17	0	9	11	7	11	1	7	4
Isolda pulchella	0	0	0	0	0	0	0	0	0	1	4	4	3	7	5	0	4	4
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	8	4	12	8	0	20	12	16	8	8	9	4	1	1	4	0	4	6
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1
Magelona papillicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	12	20	16	8	16	24	24	4	44	11	7	19	15	13	15	0	15	11

Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio multibranchiata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Sigambra grubii	0	0	0	0	0	0	0	0	0	0	0	1	2	0	1	0	2	0
*Sigamb*ra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	0	0	0	0	0	0	0	0	0	1	0	1	2	3	0	0	0	0
Bulla sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	32	16	8	4	12	20	32	20	48	9	4	23	31	58	47	3	166	14
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Anomalocardia flexuosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma constricta	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	76	60	32	12	24	0	32	24	44	1	1	0	0	0	2	0	2	0
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Tagelus divisus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	1
Tellina sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	56	96	0	56	36	12	116	92	144	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	516	728	828	792	532	536	728	716	744	0	0	0	0	0	0	0	2	1
Senticaudata sp.1	0	0	40	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	4	4	8	8	0	0	0	0	0	0	0	0	3	0	0	0	1	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	0

Panopeidae sp.1	4	0	0	12	8	16	8	8	8	0	0	0	0	0	0	0	0	0
Alpheus sp.1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	2
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	80	68	28	144	68	76	168	136	200	0	0	0	0	2	0	0	0	0
Uromunna cf. *peterseni*	28	28	24	40	48	32	88	108	72	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	92	64	92	48	56	28	224	240	208	6	9	3	7	14	15	4	19	7
Monokalliapseudes schubarti	360	280	372	208	124	220	356	224	488	0	0	0	0	1	0	1	0	0
Sinelobus stanfordi	544	720	824	128	204	184	480	252	228	0	0	0	1	0	0	0	0	0
Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	4	4	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**361**	**362**	**363**	**364**	**365**	**366**	**367**	**368**	**369**	**370**	**371**	**372**	**373**	**374**	**375**	**376**	**377**	**378**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	1	0	0	0	3	0	0	0	0	0	0	0	0	1	0	1	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	3	1	5	3	0	0	0	1	3	0	0	0	7	0	0	2	2
Sipuncula	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	5	1	1	3	0	0	0	1	2	1	1	0	0	0	1	2	0
Nemertea sp.1	0	0	0	1	0	0	0	0	0	1	1	0	0	1	0	2	1	2
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oligochaeta	0	0	30	90	28	1	0	0	18	0	0	0	0	6	0	16	127	18
Alitta succinea	3	0	2	1	2	0	0	0	0	0	0	0	0	0	0	5	10	1
Aricidea spp.	0	0	1	0	1	0	0	0	0	2	1	0	0	3	0	0	0	0
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	0	1	3	3	0	0	0	0	6	0	0	0	0	0	0	0	7	0
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	4	3	4	14	6	0	0	0	1	3	3	0	0	4	0	0	3	3
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heteromastus cf. *similis*	11	12	14	28	10	0	0	0	6	3	11	0	0	18	0	24	20	13

Isolda pulchella	8	2	2	6	5	0	0	0	5	0	0	0	0	4	0	0	1	2
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	4	1	2	1	0	0	1	0	1	0	0	0	0	1	0	2	2	0
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	0	5	3	4	7	0	0	0	0	2	1	0	0	4	0	1	3	3
Nereis oligohalina	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio multibranchiata	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	2	1	0	0	0	0	1	3	1	0	0	3	0	2	0	0
Sigambra grubii	0	1	3	6	1	0	0	0	0	0	0	0	0	4	0	1	4	4
*Sigamb*ra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	1	1	4	14	5	0	0	0	6	0	0	0	0	5	0	0	2	0
Bulla sp.1	0	1	1	3	2	0	0	0	1	0	2	0	0	1	0	0	0	1
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	5	9	29	70	12	4	2	0	0	32	15	7	10	30	0	6	3	16
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma constricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	2	1	5	6	1	0	0	0	0	2	1	0	0	15	0	2	7	8
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus divisus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Tellina cf. *versicolor*	0	0	0	1	2	0	0	0	0	0	0	0	0	1	0	0	0	0
Tellina sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senticaudata sp.1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	3	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Panopeidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alpheus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	0	0	0	8	1	0	1	0	0	1	0	9	3	4	0	1	0	0
Monokalliapseudes schubarti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sinelobus stanfordi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**379**	**380**	**381**	**382**	**383**	**384**	**385**	**386**	**387**	**388**	**389**	**390**	**391**	**392**	**393**	**394**	**395**	**396**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	1	0	0	4	0	0	0	2	0	0	0	0	0	0	0	0	1
Nemertea sp.1	0	1	0	0	3	0	0	1	1	1	0	0	1	4	0	5	1	2
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oligochaeta	0	2	0	0	2	0	0	0	3	13	0	0	0	6	0	1	0	11
Alitta succinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aricidea spp.	0	25	0	0	39	0	0	3	24	92	0	0	6	64	0	40	7	201
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diopatra sp.1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	5	0	0	4	0	0	2	9	6	0	0	0	1	0	2	3	2

Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	1	0	0	1	0	0	2	3	0	0	0	2	3	0	0	1	0
Heteromastus cf. *similis*	0	4	0	0	0	0	0	0	1	2	0	0	0	0	0	1	0	0
Isolda pulchella	0	1	0	0	1	0	0	0	1	1	0	0	0	0	0	2	0	0
Isolda sp.	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Magelona papillicornis	0	2	0	0	7	0	0	3	5	1	0	0	0	3	0	1	3	4
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	33	0	0	22	0	0	2	8	8	0	0	0	6	0	0	2	1
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Prionospio multibranchiata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	2	0	0	3	0	0	0	2	1	0	0	0	3	0	1	1	5
Sigambra grubii	0	7	0	0	6	0	0	0	6	1	0	0	0	8	0	5	0	1
*Sigamb*ra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	0	20	0	0	30	0	0	1	6	2	0	0	0	2	0	0	1	5
Bulla sp.1	1	17	0	0	9	0	0	0	6	1	0	0	0	0	0	1	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	2	1	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	1
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma constricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus divisus	0	2	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0

Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1
Tellina sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senticaudata sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panopeidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alpheus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	3	21	0	59	99	0	0	0	63	4	0	2	0	3	1	2	2	13
Monokalliapseudes schubarti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sinelobus stanfordi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**397**	**398**	**399**	**400**	**401**	**402**	**403**	**404**	**405**	**406**	**407**	**408**	**409**	**410**	**411**	**412**	**413**	**414**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	2	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Nemertea sp.1	3	4	1	2	0	1	0	1	2	0	0	0	0	0	0	0	0	0
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	4	4	0	0	0	0	12	0	0
Oligochaeta	1	5	3	2	0	3	0	1	0	16	0	0	88	68	60	120	308	176
Alitta succinea	0	0	0	0	0	0	0	0	0	8	0	4	0	4	0	0	0	0
Aricidea spp.	43	32	38	25	1	16	5	17	6	0	0	0	0	0	0	0	0	0
Armandia hossfeldi	1	0	0	0	0	2	0	1	3	0	0	0	0	0	0	0	0	0

Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4	0
Capitella cf. *capitata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	4	2	2	5	0	1	0	2	0	0	0	0	0	0	0	0	0	0
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	2	4	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Heteromastus cf. *similis*	1	1	3	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0
Isolda pulchella	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	0	0	0	0	0	0	0	0	0	12	16	8	12	8	8	16	0	12
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Magelona papillicornis	15	7	10	14	0	9	12	12	4	0	0	0	0	0	0	0	0	0
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	28	27	19	21	0	28	13	8	5	0	0	0	0	0	0	0	0	0
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	0	0	0	0	0	0	0	0	0	4	12	12	8	16	16	12	4	8
Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio multibranchiata	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio pinnata	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	1	9	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Sigambra grubii	18	36	9	11	1	18	18	10	7	0	0	0	0	0	0	0	0	0
*Sigamb*ra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	3	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulla sp.1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	0	2	1	0	0	2	0	1	0	24	32	20	52	16	56	20	60	52
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0

Macoma constricta	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus divisus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	0	1	0	68	80	64	56	56	72	64	48	92
Gammaridea sp.2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.4	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	4	0	0	8	0	0	0
Monocorophium acherusicum	0	0	0	0	0	0	0	0	0	284	384	412	500	352	468	348	600	440
Senticaudata sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	4	0	4
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panopeidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
Alpheus sp.1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	0	0	4	1	3	1	0	0	0	0	0	0	0	0	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	0	20	12	8	4	12	4	12	4
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	32	28	20	64	48	20	8	64	20
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	6	12	7	3	1	1	0	0	0	52	72	24	48	36	48	88	124	120
Monokalliapseudes schubarti	0	0	0	0	0	0	0	0	0	360	616	276	392	116	416	184	308	216
Sinelobus stanfordi	0	0	0	0	0	0	0	0	0	176	188	216	160	76	128	156	160	120
Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	0	0	0	0	0	0	0	0	0	60	64	48	100	44	52	124	96	140
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**415**	**416**	**417**	**418**	**419**	**420**	**421**	**422**	**423**	**424**	**425**	**426**	**427**	**428**	**429**	**430**	**431**	**432**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Nemertea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hirudinea sp.1	0	0	0	0	0	0	8	0	4	0	0	0	0	0	0	0	0	0
Oligochaeta	40	24	192	12	4	8	8	12	4	32	4	14	15	1	1	4	1	21
Alitta succinea	4	4	4	12	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Aricidea spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boccardiella cf. *truncata*	0	0	0	4	0	0	0	0	0	0	0	0	2	0	1	0	0	0
Capitella cf. *capitata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heteromastus cf. *similis*	4	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0
Isolda pulchella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	32	16	12	20	16	12	0	0	8	4	0	5	4	0	1	4	3	8
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	8	4	8	16	4	16	4	8	12	10	13	9	7	9	12	16	5	14

Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio multibranchiata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sigambra grubii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*Sigamb*ra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulla sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	0	20	12	24	8	0	0	8	16	5	5	3	7	6	2	6	3	14
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma constricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Mytella guayanensis	4	12	16	20	12	16	0	0	4	2	2	0	1	2	0	1	1	4
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus divisus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	12	148	20	4	56	24	2	16	20	9	9	11	25	20	35
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	1
Monocorophium acherusicum	16	60	108	304	0	284	240	488	928	121	38	79	80	99	116	51	48	179
Senticaudata sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	0	0	4	8	4	0	4	8	0	0	0	0	1	1	0	2	0	2
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Panopeidae sp.1	0	4	0	4	0	0	0	0	0	1	3	6	3	7	4	1	0	6
Alpheus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	12	20	20	28	28	8	68	124	136	18	17	24	19	40	19	24	37	59
Uromunna cf. *peterseni*	0	0	0	24	20	4	16	4	28	43	17	32	18	20	15	17	9	23
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	16	92	168	96	68	28	0	16	28	33	34	66	9	11	7	12	9	16
Monokalliapseudes schubarti	32	56	132	52	48	76	44	160	172	45	5	22	78	44	105	70	66	76
Sinelobus stanfordi	272	308	524	216	184	200	0	44	16	24	3	23	23	13	32	29	21	78
Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	0	0	0	56	0	24	0	28	24	6	2	5	5	1	5	10	7	6
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	4	0	4	0	4	0	0	1	0	0	0	0	0	2	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**433**	**434**	**435**	**436**	**437**	**438**	**439**	**440**	**441**	**442**	**443**	**444**	**445**	**446**	**447**	**448**	**449**	**450**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	8	0	0	0	0	0	0	0	0	0	1	0	6	1	0	1	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	2	0	0	2	0	0	0	0	0	6	9	0	7	3	5	4	3	4
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Nemertea sp.1	0	0	0	1	0	0	0	0	0	1	1	1	1	0	1	0	1	2
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oligochaeta	63	0	0	87	0	0	0	0	0	6	23	40	9	65	15	82	36	69
Alitta succinea	0	0	0	0	0	0	0	0	0	0	1	0	0	1	3	1	1	3
Aricidea spp.	0	0	0	0	0	0	0	0	0	1	1	2	5	0	0	2	0	2
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	2	0	0	4	0	0	0	0	0	0	0	0	0	1	0	0	1	0
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	0	0	0	0	0	0	0	0	0	4	2	4	6	4	3	6	4	1
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heteromastus cf. *similis*	2	0	0	7	0	0	0	0	0	5	18	8	10	17	36	17	24	18

Isolda pulchella	1	0	0	6	0	0	0	0	0	0	3	1	4	1	1	0	0	0
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	1	0	0	3	0	0	0	0	0	0	1	0	0	2	1	0	0	0
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	1	0	0	9	0	0	0	0	0	2	4	5	4	6	5	1	6	4
Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0
Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio multibranchiata	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	2	3
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	0	0	0	0	0	0	0	0	6	3	3	0	0	0	1	2
Sigambra grubii	0	0	0	1	0	0	0	0	0	1	0	0	0	1	30	4	1	2
*Sigamb*ra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	0	0	0	0	0	0	0	0	0	3	3	6	13	7	4	22	4	13
Bulla sp.1	0	0	0	0	0	0	0	0	0	0	6	12	9	4	3	4	1	16
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	1	0	13	0	7	7	3	4	0	39	485	454	47	9	9	19	4	34
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Phacoides pectinatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma constricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	0	0	0	3	0	0	0	1	0	5	19	25	14	9	9	19	3	20
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
Tagelus divisus	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	2	0	2
Tellina cf. *versicolor*	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senticaudata sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panopeidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alpheus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	0	0	0	3	3	5	0	1	2	1	2	2	1	1	0	2	1	3
Monokalliapseudes schubarti	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Sinelobus stanfordi	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**451**	**452**	**453**	**454**	**455**	**456**	**457**	**458**	**459**	**460**	**461**	**462**	**463**	**464**	**465**	**466**	**467**	**468**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	2	0	0	1	8	0	2	2	4	0	0	0	0	0	0	0	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	3	0	1	5	4	5	4	3	1	2	0	1	0	0	0	0	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	0	0	2	2	0	2	0	0	0	0	0	0	0	0
Nemertea sp.1	0	0	0	1	1	0	1	0	0	5	2	6	2	3	0	2	1	2
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oligochaeta	72	0	115	90	169	89	5	4	11	7	0	9	5	0	2	2	0	4
Alitta succinea	0	0	1	6	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Aricidea spp.	0	0	0	0	3	0	0	0	3	46	26	49	44	76	96	36	24	46
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	5	0	4	5	4	3	0	0	0	0	0	0	0	0	0	0	0	0
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	2	0	0	0	6	1	4	4	5	13	2	5	1	3	5	5	1	4

Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Hermundura tricuspis	1	0	0	0	0	0	0	0	0	5	2	0	6	1	0	2	1	2
Heteromastus cf. *similis*	9	0	21	15	22	25	14	29	40	7	0	2	0	1	3	8	0	4
Isolda pulchella	0	0	1	2	5	12	3	4	8	2	0	0	0	0	1	1	2	1
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	0	0	4	3	3	0	0	0	2	1	0	0	0	0	0	0	0	0
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lumbrineridae sp.1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	0	0	0	0	0	0	0	0	0	1	1	1	0	0	2	2	4	2
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	0	0	0	0	1	0	0	0	1	22	3	23	22	16	22	13	4	13
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	3	0	7	3	8	5	2	0	1	0	0	0	0	0	0	0	0	0
Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Phyllodoce pettiboneae	1	0	0	0	0	0	0	1	0	0	0	0	0	2	3	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0

Prionospio multibranchiata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	0	0	1	1	5	2	5	2	2	0	1	1	0	2	0	1	0	2
Sigambra grubii	3	0	2	2	2	9	6	12	4	5	1	7	2	4	3	4	2	6
*Sigamb*ra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	1	0	0	2	3	1	7	4	3	12	4	9	6	11	29	22	2	18
Bulla sp.1	0	0	0	0	2	0	0	0	1	15	0	4	9	2	0	8	1	10
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	6	0	3	3	20	3	32	26	54	0	0	1	2	2	0	0	0	0
Nassarius polygonatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Macoma constricta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	7	0	0	2	20	4	24	47	74	1	1	0	5	1	0	2	0	1
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	1	0	0
Tagelus divisus	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0

Tellina cf. *versicolor*	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1
Veneridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senticaudata sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	2	0	0	1	0	0	0	1	0	0	0	1	1	0	2	0	0	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Panopeidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Alpheus sp.1	0	0	0	0	0	0	1	0	0	0	0	2	0	3	0	0	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0	0	0
Harpacticoida sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	4
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	1	2	0	0	1	1	0	0	0	37	13	86	62	53	76	41	2	46
Monokalliapseudes schubarti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sinelobus stanfordi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Anexo D. Continuação...

Taxa / Amostra	**469**	**470**	**471**	**472**	**473**	**474**	**475**	**476**	**477**	**478**	**479**	**480**	**481**	**482**	**483**	**484**	**485**	**486**
Ceriantharia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Cnidaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Edwardisiidae sp.1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Cnidaria – simple Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cnidaria – branched Polyp sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phoronis sp.1	0	1	1	5	0	0	1	0	0	0	0	1	1	0	0	0	0	0
Sipuncula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plathelminthes sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nemertea sp.1	3	2	0	3	1	0	3	3	3	2	3	2	1	1	0	1	0	1
Hirudinea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oligochaeta	26	58	47	52	14	0	38	34	16	2	2	3	0	0	0	0	1	0
Alitta succinea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aricidea spp.	142	119	90	99	121	4	143	137	171	39	51	45	5	13	14	13	5	11
Armandia hossfeldi	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	0	1	1

Boccardiella cf. *truncata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitella cf. *capitata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diopatra sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dipolydora socialis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exogone sp.1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Glycinde multidens	6	7	0	2	8	0	6	1	4	5	3	0	2	0	1	0	0	0
Goniada littorea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniada maculata	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemipodia simplex	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
Hermundura tricuspis	0	0	4	0	0	1	0	3	2	2	0	1	0	0	0	1	1	1
Heteromastus cf. *similis*	2	1	9	4	4	0	2	2	2	4	0	1	0	0	0	0	0	0
Isolda pulchella	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Isolda sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laeonereis pandoensis	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocapitellides sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leitoscoloplos kerguelensis	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Lumbrineridae sp.1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magelona papillicornis	1	5	5	3	5	0	7	4	9	9	6	14	1	3	3	6	8	6
Magelona posterelongata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mediomastus sp.1	11	10	14	10	19	2	13	10	15	26	17	30	4	14	6	6	4	10
Myrianida sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nephtys fluviatilis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis oligohalina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nereis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notomastus sp.1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0
Odontosyllis sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onuphidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxydromus sp.1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0

Orbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholoididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodoce pettiboneae	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phyllodocidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poecilochaetus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalinoecia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio multibranchiata	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prionospio pinnata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sabellidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scoloplos cf. *rubra*	5	0	8	3	1	0	3	0	0	4	3	2	0	0	1	0	1	1
Sigambra grubii	2	4	6	3	3	0	7	2	2	21	24	0	8	8	6	20	4	4
*Sigamb*ra sp.1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiochaetopterus sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiophanes duplex	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Streblospio cf. *benedicti*	2	1	3	6	4	0	4	5	3	3	2	0	0	0	0	0	0	0
Bulla sp.1	4	0	15	5	7	0	9	0	4	0	1	1	0	0	0	0	0	0
Epitonium cf. *celesti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified Gastropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heleobia australis	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nassarius polygonatus	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Solariorbis shumoi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stramonita haemastoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nudibranchia sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anomalocardia flexuosa	1	0	3	0	3	0	2	0	0	0	0	1	0	0	0	0	0	0
Bivalve juvenil sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bivalve juvenil sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corbula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacoides pectinatus	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

Macoma constricta	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
Macoma tenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mytella guayanensis	0	1	1	0	0	0	1	0	5	0	2	0	0	0	0	1	0	0
Pitar cf. fulminata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus cf. *plebeius*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tagelus divisus	1	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0
Tellina cf. *versicolor*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tellina sp.1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
Veneridae	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Gammaridea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	1	0	0
Gammaridea sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gammaridea sp.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corophiidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monocorophium acherusicum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Senticaudata sp.1	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0
Ciclodorippidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyura Megalopa	0	0	1	0	0	0	0	0	0	1	0	2	0	1	1	0	0	0
Brachyura juvenil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.1 (juvenile)	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca maracoani	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uca thayeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panopeidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alpheus sp.1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harpacticoida sp.1	0	0	0	0	0	0	0	2	0	0	2	1	3	1	3	0	0	0
Harpacticoida sp.2	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumacea sp.1	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	7	3	2
Ancinus seticomvus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Cassidinidea fluminensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Uromunna cf. *peterseni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pseudosphaeroma cf. *jakobii*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostracoda	7	0	2	5	15	3	2	7	17	3	3	2	9	0	2	0	0	0
Monokalliapseudes schubarti	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sinelobus stanfordi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acari sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichoptera sp.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceratopogonidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chironomidae sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colembola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dolichopodidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
pupae of Diptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insect larva sp.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plecoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ophiuroidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0